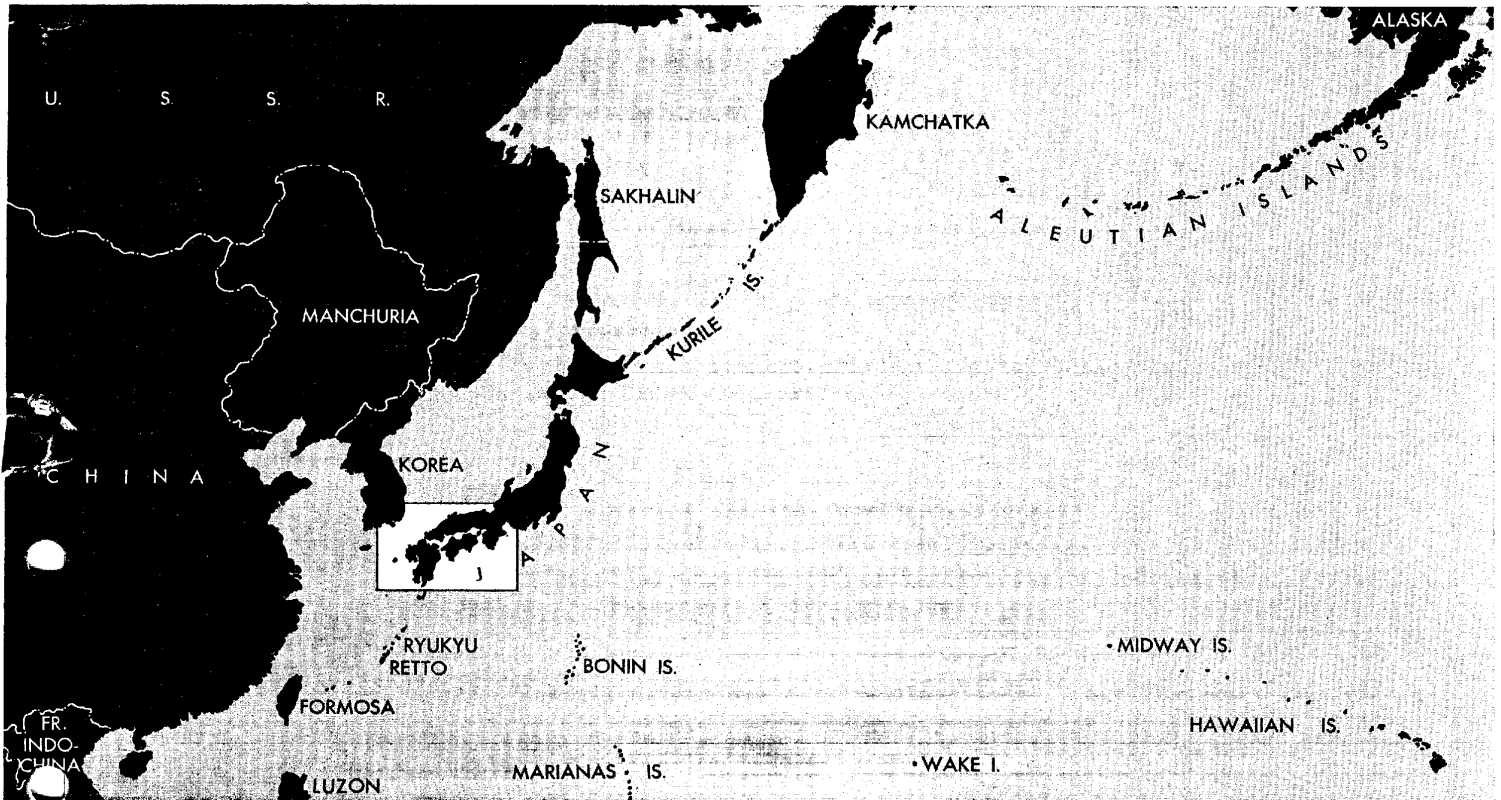


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## CHAPTER VIII

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## JOINT ARMY-NAVY INTELLIGENCE STUDY

OF

# SOUTHWEST JAPAN:

Kyūshū, Shikoku, and Southwestern Honshū

## CITIES AND TOWNS

AUGUST 1944

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## Chapter VIII

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## CITIES AND TOWNS

## 80. Introduction

Southwest Japan is the most highly urbanized section of the entire Japanese Empire; it includes 4 of the 6 great cities of Japan, and over  $\frac{3}{4}$  of all Japanese cities of more than 100,000 population. Of the 182 *shi* (chartered municipalities) in Japan, 100 fall within the area under consideration (FIGURE VIII-105).\*

The cities of Southwest Japan are focal points of Japanese military strength as they include the major naval bases and the principal industrial centers manufacturing war supplies. Outside this area, only Tōkyō and Yokohama are of major industrial significance.

## A. Pattern of urban settlement.

More than  $\frac{4}{5}$  of the *shi* in Southwest Japan are within 10 miles of the sea. The majority are actually on the coast, but many are located 2 to 10 miles inland and reach the sea through extensions of the urban area or through nearby outports. Although virtually every city and town is within shelling range of salt water, scarcely a single town is exposed to direct attack from the open sea. Only half a dozen *shi* on the irregular southern coast are within 10 miles of the open Pacific, and only 8 lie on the comparatively smooth coastline of the Japan Sea which, in sharp contrast to the southern coast, has very few coastal or bay-head plains or deltas (FIGURE VIII-105).

Most of the cities and towns are clustered on coastal deltas and plains on the margins of the Inland Sea (Seto-naikai), access to which lies through heavily fortified inlets, or at the heads of long bays such as Ise-wan near Nagoya or the Shimabara-kaiwan in Western Kyūshū (FIGURE VIII-106).

One cluster of 14 *shi* lies on the large plains around Ise-wan (bay). A group of 18 is located on the relatively large plains and basins near Ōsaka at the eastern end of the Inland Sea, and 28 more *shi* are strung along the margins of the Inland Sea on Honshū, Kyūshū, and Shikoku at points where rivers rush down from the hills to debouch onto small coastal plains and deltas. A compact group of 10 *shi* occupies both sides of Shimonoseki-kaikyo (strait) at the western entrance to the Inland Sea. This group differs from all others in that it owes its existence primarily not to the productivity of fertile agricultural plains but to the presence of coal and the consequent development of heavy industry. The 11 *shi* of western Kyūshū are widely distributed among the bays and inlets.

## B. Degree of urbanization.

Forty per cent of the total population of Southwest Japan live in the cities and towns classed as *shi*. In 3 areas, more than  $\frac{1}{2}$  the total population is urban: on the plains at the head of Ise-wan, on the plains east of Ōsaka-wan at the eastern end of the Inland Sea, and in the Shimonoseki Straits area at the western end of the Inland Sea.

\* Some variations between spellings of place names in the text and maps may be found. Reference should be made to the Gazetteer.

## C. Functions of cities and towns.

The 100 *shi* of southwest Japan fall into 8 main functional types, according to the outstanding occupation of each *shi*.

In 28 of the urban units, manufacturing is clearly the major activity. These industrial cities are located near Nagoya at the head of Ise-wan and around the Inland Sea, particularly near Ōsaka at the eastern end and near Yawata at the western end. None of the cities on the Japan Sea or the Pacific Ocean is primarily industrial.

Of major strategic significance are the *shi* dominated by governmental functions, such as the 3 great naval bases of Sasebo, Kure, and Higashi-Maizuru, and the army and administrative centers of Hiroshima, Kumamoto, Himeji, and Matsuyama.

The 5 transportation centers include Kōbe, the principal foreign-trade port of Japan; Tsuruga, the main port on the Japan Sea; Shimonoseki and Moji at the 2 sides of Shimonoseki-kaikyō; and nearby Wakamatsu, port for the heavy industries of northern Kyūshū.

Twelve of the *shi* are primarily trade centers for adjacent farming regions, with manufacturing of slight importance. Two of these trade centers are important tourist centers, Nara, with many historical shrines, and Beppu, with hot springs.

Four *shi* are dominated by coal mining, namely, Ube and Ikuta on Honshū and Izuka and Ōmuta on Kyūshū.

Fishing is a principal activity in 2 *shi*: Hagi on the Japan Sea, and Niihama on the Inland Sea.

Ashiya, though a chartered municipality, is a residential suburb in the Kōbe-Ōsaka metropolitan complex.

The largest single group, including 36 *shi*, is called diversified (multi-functional), as no single activity dominates the life of the city. Of these the most important is Ōsaka, the leading manufacturing city of Japan, but also a major commercial center.

## D. General characteristics of cities and towns in the area.

Except for the downtown business and industrial districts of Ōsaka, Kōbe, Kyōto, and Nagoya, which are Western in appearance, the cities and towns in Southwest Japan have the traditional Japanese aspect. Unpainted frame buildings with slate-colored tile roofs of nearly uniform height face directly on narrow streets surfaced with stone. Open gutters carry drainage and refuse water from the houses on each side.

In many of the smaller towns there are no well-marked residential and commercial sections, since throughout these towns many streets are lined with shops, operated by a family living either to the rear or in the second story. The street pattern is commonly rectangular in the center of the town or city but often becomes irregular on the outer expanding edges of urban growth. Rivers, canals, and bridges are present in most towns.

All the 100 *shi* of Southwest Japan are served by railroads. Water transportation is available in most towns either by virtue of seaside location or through short river or canal connections. Bicycles and rickshaws are a major means of trans-

portation in most cities and towns. Telegraph and telephone facilities are available in all cities and towns of any consequence, though few residences have telephones. Nearly all urban homes are lighted by electricity.

### B. Major cities and towns.

The major cities and towns are discussed in 7 groups as indicated on FIGURE VIII-105.

SECTION 81. The Nagoya area at the head of Ise-wan (bay) (Nagoya, Gifu, and Toyohashi).

SECTION 82. The Ōsaka area at the eastern end of the Inland Sea (Ōsaka, Kōbe, Kyōto, Wakayama, Sakai, and Amagasaki).

SECTION 83. The remaining parts of the Inland Sea area (Okayama, Kure, Hiroshima, Matsuyama, Niihama, Takamatsu).

SECTION 84. The northern coast of southern Honshū, called Sanindō (Maizuru and Higashi-Maizuru, Tsuruga, Tottori, and Matsue).

SECTION 85. The Shimonoseki-kaikyō industrial area in northern Kyūshū and southern Honshū astride Shimonoseki-kaikyō (Shimonoseki, Hiko-shima, Moji, Ube, Yawata, Tobata, Wakamatsu, Kokura, and Fukuoka).

SECTION 86. West central Kyūshū (Sasebo, Nagasaki, Kurume, Ōmuta-Miike, Kumamoto).

SECTION 87. Eastern Kyūshū and southern Shikoku (Kagoshima, Kōchi, Tokushima, Miyakonojō, Miyazaki, Nobeoka, Sacki, Ōita, and Beppu).

## 81. Nagoya Area

### A. Introduction.

The Nagoya area, located on the southern side of central Honshū, includes the Nōbi-heiya (plain) on the southern margin of which Nagoya rests, and the associated lowland sections around the eastern and western margins of Ise-wan (bay). In Japan, the Nōbi Plain is second only to Kantō-heiya (plain) in area, and contains one of the largest concentrations of population and industry in the country.

Although handicapped by an inferior harbor, the city of Nagoya is an industrial and commercial nucleus serving the many smaller industrial cities of the area. The Nagoya area is served by an elaborate network of steam and electric railways, and by a meager highway system. Abundant hydroelectric power is available.

Nagoya is the principal port city of this area. Before the elaborate harbor development of Nagoya, the port of Yokkaichi imported much of the raw material and exported finished textile and porcelain products. It is still an important Ise-wan commercial center.

There are 50 large industrial plants in Nagoya. In accordance with the policy of decentralizing industry, however, many new factories have been located well away from Nagoya, in cities and towns to the north (Gifu, Ōgaki, and Ichinomiya), and to the south around Ise-wan (Yokkaichi, Toyohashi, and Kuwana). These cities have long had textile, porcelain, or paper-manufacturing industries, but a more diversified, if predominantly military, industrialization has taken place in recent years.

Nōbi-heiya is covered by a fertile alluvial soil, and requires less irrigation than Kantō-heiya. Although portions of western Nōbi are not well drained, the average density of population exceeds that of Kantō-heiya. The coastal lowland of Ise-wan is less favored agriculturally, though, like Nōbi-heiya, it produces silk and vegetables, and, to a lesser degree, rice. Tea and oranges are also of considerable importance around the shores of Ise-wan.

### B. Nagoya (1940 population: 1,328,084).

#### (1) Importance.

Nagoya (FIGURE VIII-107) ranks third in population among Japanese cities, and is one of the 3 greatest industrial cities of the country. Its products consist largely of textiles, pottery, processed foods, and machinery. In volume of foreign trade, Nagoya normally ranked fourth. Furthermore, its strategic location, about mid-way between Tōkyō and Ōsaka on the southern coast of southwestern Honshū, contributes to its domestic importance as a center of trade and industry. By 1939, the industrial plants of Nagoya were reported to have switched very largely to the production of military equipment, and the city now undoubtedly occupies a key position in such production. The Mitsubishi Aircraft Plant (FIGURE VIII-1) on Nagoya harbor and its affiliated plants in the Nagoya area are reported to be responsible for the production of about 20% of Japanese aircraft. The Aichi Aircraft Works is also located in Nagoya.

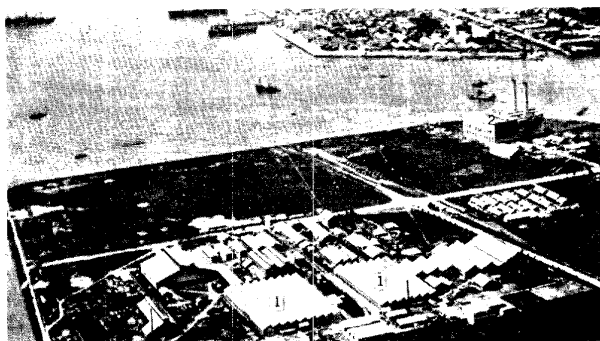


FIGURE VIII-1. Nagoya.

Airview of the Mitsubishi Aircraft Plant on Nagoya Harbor. Looking WNW, 1932. 1. Mitsubishi Aircraft Plant, 2. Steam power plant.

#### (2) Physical characteristics.

(a) *Relation to surface features.* Nagoya is on the southern margin of Nōbi-heiya, a short distance inland from the northeastern extremity of shallow Ise-wan (FIGURE VIII-2), with which the city is connected by the Naka-gawa-unga (canal) and the Horikawa (FIGURE VIII-107). Nagoya's southernmost ward, Atsuta, lies to the northeast of the bay, about 2 miles at its closest point from the harbor, with which it is joined by the canalized Hori-kawa. To the south, in Ise-wan, stretches the Chita-hantō (peninsula), which protects the harbor of Nagoya from typhoons.

(b) *Shape and dimensions.* The city occupies about 162 square kilometers (65 square miles) of land, sprawling in irregular fashion away from Ise-wan and extending farther north-south than east-west, with most of the city well away from the harbor.



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## CITIES AND TOWNS

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FIGURE VIII - 2. Nagoya.  
Airview of Nagoya Harbor on Ise-wan. Looking E.

(c) *Degree of compactness.* Nagoya city is compact in structure with one major outlying tentacle (FIGURE VIII-107) stretching south to the harbor. Its population density averages about 7,400 per square kilometer (18,500 per square mile), a density, however, in no way comparable to those of Tōkyō or Ōsaka.

(d) *Differentiated sections.* Many of the large industries are located along the water front (FIGURE VIII-107) and throughout the southern section of the city (FIGURE VIII-3), particularly in the vicinity of the Hori-kawa canal. There is an industrial development on the Tōkaidō near Atsuta Station in the southern part of the city (FIGURE VIII-107). The commercial area (FIGURE VIII-4) spreads to the east of Nagoya station and to the south of Nagoya castle.

(e) *Street plan.* The street pattern is highly erratic but follows a roughly rectangular alignment, greatly modified by the newly developed modern thoroughfare and the canals and rivers that flow through the city. There are 542 bridges within Nagoya.

(f) *Open spaces.* Open spaces within Nagoya include 22 parks. There are probably numerous undeveloped areas between the area of main development and the harbor. The compound of Nagoya castle (FIGURE VIII-5) in northern Nagoya provides a large open space.

### (3) Means of access.

(a) *Water.* Access to the central city may be had via the harbor, and either Hori-kawa or the Naka-gawa-unga (FIGURE VIII-6). The harbor is reported to be able to accommodate approximately 38 ships of 10,000 tons. Recent developments have probably augmented this capacity.

(b) *Rail.* The Rinko Railway provides access from the south. From the southeast the Tōkaidō line connects Tōkyō with Nagoya and the same line links Nagoya with Kōbe, Ōsaka, and Kyōto from the southwest; from the northeast the Chuo links Tōkyō with Nagoya through the central mountainous regions; and the Kansai connects Ōsaka with Nagoya, by

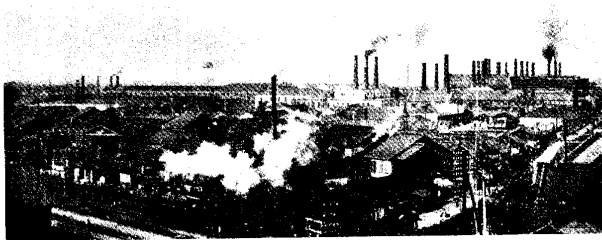


FIGURE VIII - 3. Nagoya.  
Southern Nagoya industrial plants.



FIGURE VIII - 4. Nagoya.  
The commercial section.



FIGURE VIII - 5. Nagoya.

Nagoya castle and residential area. 1. Nagoya castle.

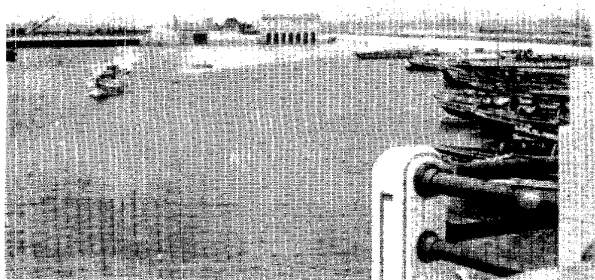


FIGURE VIII - 6. Nagoya.

The Naka-gawa Canal. Looking N.

way of Mie and Nara prefectures from the west. Further access by rail may be had by way of the Meigi Electric Railway, which extends from Gifu, Ichinomiya, and Inuyama south to Nagoya. The Seto Electric Railway runs to Nagoya from the east and the Aichi Electric Railway from the south-east, from the cities of Toyohashi and Tokoname. Branch lines around Ise-wan and its peninsulas provide a virtually complete rail network.

(c) *Road.* New concrete highways connect Nagoya with newly constructed armament plants in the outlying area, and Nagoya now has highway connections with the north coast of Honshu.

(d) *Air.* There are 2 airfields in Nagoya, one a civil airport.

#### (4) *Billeting facilities.*

A few small hotels, none with more than 30 rooms, such as the Mampei, the Dalichi, and the Nagoya, provide limited billeting space in the commercial area. The numerous school buildings (there were 118 municipal primary schools alone in 1937) distributed throughout the entire city area seem to afford the most adequate resources for billeting.

#### (5) *Buildings.*

By provision of the City Planning Law of 1919, buildings in this city must not exceed 65 feet in height in some quarters, and 100 feet in others. This regulation, induced by fear of earthquakes, has resulted in a low city profile.

In 1935, there were 289,799 buildings in Nagoya, nearly all of them constructed of wood (FIGURE VIII-5). Only in the commercial area south of Nagoya castle are modern structures common. It is reported that very little reinforced concrete or steel construction has been used in the new war factories. These new buildings are mainly 1-story buildings with unreinforced

concrete walls and asbestos roofs. The number of pre-war industrial plants of various types in Nagoya is given in the following list:

Textile	577
Metal working	362
Mechanical	815
Pottery and porcelain	194
Chemical	150
Sawmill and woodwork	588
Printing and bookbinding	173
Food-processing and beverage	415
Gas and electric	3

#### (6) *Internal transportation.*

Nagoya station (FIGURE VIII-7) is the terminal from which street-cars and buses run in all directions. Municipally owned street railways (FIGURE VIII-4) had a total 1940 trackage of about 84.4 kilometers (52.2 miles), and operated 316 cars over 22 routes. These are reported to carry an annual total of nearly 80,000,000 passengers. This service is augmented by the Tsukiji Electric Railway and Shin Mikawa Electric Railway, privately owned lines making connections between the center of Nagoya and suburban areas.

Light motor buses have operated for years on all the principal streets and in 1938 had lines totalling about 156 kilometers (97 miles). Rickshas and bicycles comprise the largest part of the 200,000 vehicles of Nagoya. Street transportation has been improved in recent years by the superimposition of a new system of modern thoroughfares on the old pattern of narrow, irregular streets. One of these streets is about 43.6 meters (143 feet) wide; 14 are about 32.7 meters (107 feet) wide; 44 are about 24.5 meters (81 feet) wide; and one measures about 14.6 meters (48 feet) in width.

The Naka-gawa canal (FIGURE VIII-6), the largest canal in the Orient, provides transportation among the canal-side industries and between them and the harbor. It extends from the western point of the port of Nagoya to Hori-kawa, north of the city, and has 2 locks. The canal's freight absorption potential is calculated at 3,456,000 tons annually. It measures almost 8,208 meters (5.1 miles) in length, and varies from about 63 to 93 meters (203 feet to about 305 feet) in width, and is about 3 meters (9.7 feet) in depth throughout. It is crossed by 12 bridges.

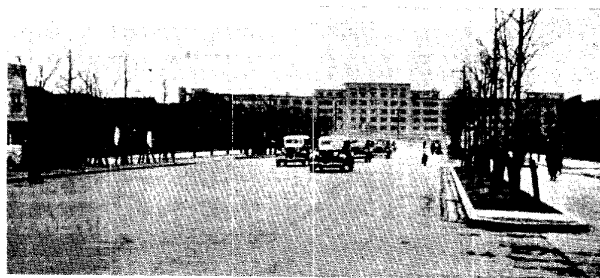


FIGURE VIII - 7. Nagoya.

Railway station.

#### (7) *Repair and service facilities.*

Repair and service facilities are available for almost every type of machinery, including aircraft, at the Mitsubishi plant on the eastern side of the harbor at the entrance to the Hori-kawa canal.

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## CITIES AND TOWNS

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**(8) Public utilities.**

(a) *Electricity.* A power company supplies current from a steam generating plant, located within the city, which has a reported capacity of 108,000 kilowatts. Electricity for industrial and domestic use is supplied to all parts of Nagoya from the Nippon Electric Company grids. These plants and the Atsuta Steam power plant furnish approximately 1,000,000 kilowatts to the city.

(b) *Gas.* Gas is available in virtually all parts of the city.

(c) *Water.* In 1937 water was supplied to 172,000 households, or about 70% of the households in the city.

**(9) Warehouses and storage.**

Warehouse and storage facilities are abundant in the harbor area and also to the north, along the banks of the Naka-gawa canal.

**(10) Health and sanitation facilities.**

In 1938, health and sanitation facilities of Nagoya were as follows:

	HOSPITALS	CONVALESCENT HOMES	CLINICS
Number	3	1	4
Number of beds	448	224	—
Doctors	65	5	5
Nurses	195	25	8
Pharmacists	19	2	4

From these figures it is plain that facilities of health and sanitation in Nagoya are inadequate from the standpoint of medical personnel and hospital space.

The city sewerage system is an extensive network, reported to be adequate for the needs of the city.

**(11) Vulnerable points (FIGURE VIII-107).**

The Mitsubishi Aircraft Works.

Aichi Aircraft Works.

Locks of the Naka-gawa canal.

Nagoya station and yards.

Atsuta station and yards.

**C. Gifu (1940 population: 172,340).****(1) Importance.**

The city of Gifu (FIGURE VIII-105) lies within one of the principal electric power-producing areas of Japan, many swift streams giving this area third rank in the country. In peacetime, the industries of Gifu consisted of silk and wool textiles, porcelain, and paper products. Gifu is surrounded by one of the most heavily forested areas of Japan, and the paper industry is well established. A large branch of the Mitsubishi Aircraft Company is located 5 miles east of Gifu.

**(2) Physical characteristics.**

(a) *Location.* The city of Gifu lies at the foot of Inabayama, on the northern margin of Nobi-heiya, approximately 18 miles northwest of Nagoya. The Nagara-gawa (FIGURE VIII-8) delimits the northern boundary of the city.

(b) *Shape and dimensions.* The city is of irregular shape. In 1939 Gifu had an area of 44.51 square kilometers (17.2 square miles).

(c) *Degree of compactness.* New districts recently developed in all directions, except the northeast, have given the city a less compact appearance.

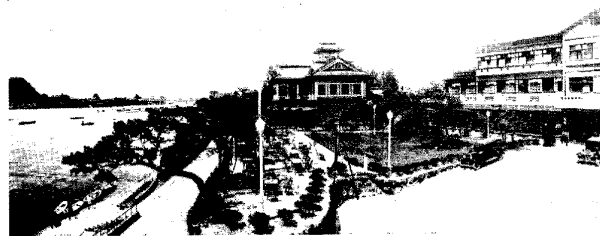


FIGURE VIII - 8. Gifu.  
The Nagara-gawa and Hotel Gifu.

(d) *Differentiated sections.* The principal industrial section of Gifu is located along the railroad, running east-west through the southern part of the city, but some industries are located in the northwest. The commercial section is in the north central part.

(e) *Street plan.* The new outer portions of the city have rectangular street patterns, but the central city has a highly irregular street arrangement.

(f) *Open spaces.* Military grounds in the otherwise undeveloped northeast sector of the city provide an open space of considerable size. In addition, parks of appreciable size are associated with the numerous shrines throughout the city.

**(3) Means of access.**

Gifu is connected by rail with Nagoya, to the south, and with Kyōto, to the west, via Hikone. The government line, the Takayama, connects the north coast ports with Gifu, via the cities of Hagiwara and Hida Kazu. This line connects with the Sanin-housen at Toyama, and continues to Tomari and Kanazawa. Gifu is also accessible from the north coast via the rail line passing through Maibara and Tsuruga. Suburban electric lines connect Gifu with neighboring towns. In all, 102 trains pass through Gifu daily.

**(4) Billeting facilities.**

Hotel billeting in Gifu is limited to the small Nagaragawa Hotel (FIGURE VIII-8), which has a capacity of only 28. In the northeast, the Military Police Headquarters must offer some billeting space. Troops can probably be billeted in the numerous temples and schools, of which a large high school in the northern part of the city would appear to be the most promising.

**(5) Buildings.**

The city hall, courthouse, and post office are all located in the north central part of Gifu. A street car company is located a few blocks directly south of these buildings. Along the railroad are 6 large textile mills and 1 tung oil plant. To the northeast are 2 more large textile mills.

**(6) Internal transportation.**

Streets are narrow and surfaced, but for the most part not suited to motor traffic. Tram lines serve the city and electrified suburban lines provide some internal tram service.

**(7) Repair and service facilities.**

There are repair facilities for most types of small machinery in Gifu, including the repair of electrical equipment and automobiles.

**(8) Public utilities.**

(a) *Water.* Water is supplied from a reservoir in the northeast part of the city. The annual amount of water supplied is 8,336,000 cubic feet.

(b) *Gas.* The annual amount of gas supplied is reported at 1,118,000 cubic feet.

(c) *Communications.* Gifu has telephone and telegraph connections with the main Japanese systems.

**(9) Warehouses and storage.**

The textile factories of Gifu have limited storage facilities.

**(10) Health and sanitation facilities.**

The following data on hospital and medical personnel in Gifu are as of 1938:

	HOSPITALS	CLINICS	CONVALESCENT HOMES
Number	1	1	1
Beds	51	—	30
Doctors	3	6	2
Nurses	10	16	3
Pharmacists	1	3	1

In 1936, a 100-bed tuberculosis sanitarium was ordered erected here and is probably functioning now.

A city sewerage system is in operation.

**(11) Vulnerable points.**

The most vulnerable point in Gifu would appear to be the railroad station and its yards, located in the south central part of the city.

**D. Toyohashi (1940 population: 242,716).****(1) Importance.**

Toyohashi (FIGURE VIII-104) is important as the site of many government military schools. Army, cavalry, artillery, infantry, gunnery, and youth military schools are located in this city. The economy of the city, however, is dominated by manufacturing. The silk industry is well developed and is served by a silk experimental station. An armament and an explosives factory also contribute to the military importance of Toyohashi.

**(2) Physical characteristics.**

(a) *Location.* Toyohashi is located in south central Honshū on the Toyo-kawa near Atsumi-wan, a southern arm of Ise-wan.

(b) *Degree of compactness.* The city of Toyohashi is less compact than most Japanese cities of its size.

(c) *Differentiated sections.* The commercial section spreads to the east of the railroad station (FIGURE VIII-9) in the eastern part of the city. The residential sections of Toyohashi lie to the south of the commercial area and are, in turn, bordered on the south by the government military schools, the armament factory, and the explosives factory (FIGURE VIII-9) in the southernmost part of the city.

(d) *Street plan.* The street plan of Toyohashi is composed of a number of differently oriented rectangular grids, intersected by streams and canals, the latter often serving as fish-breeding ponds (FIGURE VIII-9).

(e) *Open spaces.* There is a large parade ground in the northern part of the city, north of the courthouse (FIGURE VIII-9). In the east-central part of the city is another large

open space around the engineers corps barracks. The grounds of Shinto and Buddhist shrines provide additional open spaces.

**(3) Means of access.**

(a) *Water.* Lighter service along the Toyo-kawa gives Toyohashi limited access to Atsumi-wan.

(b) *Rail.* Toyohashi is located on the Tōkaidō line, 180 miles from Tōkyō. The same line also connects Toyohashi with Nagoya, to the northwest. An electric line runs between Nagoya and Toyohashi by way of Okazaki. Other electric lines run southwest to Fukue and northeast to Urakawa.

**(4) Billeting facilities.**

Billeting facilities are abundant in the military schools in the southern part of the city and in barracks (FIGURE VIII-9) near the parade grounds to the north. A number of large schools are suitable for billeting purposes.

**(5) Buildings.**

There are over 30,000 dwellings in Toyohashi, nearly all of them low structures of wood. The railroad station in the west-central part of the city is one of the more important buildings. The Standard Vacuum Oil Company maintained buildings near the station.

**(6) Internal transportation.**

(a) *Tram.* Tram car lines provide transportation within the city.

(b) *Road.* Streets are surfaced, but, with few exceptions, are narrow and unsuitable for motor traffic.

**(7) Repair and service facilities.**

Repair and service facilities are available for most small machinery. Garages located in the west-central part of the city (FIGURE VIII-9) have full equipment for the repair and servicing of internal combustion engines.

**(8) Public utilities.**

(a) *Water.* This city was supplied with 1,736,000 cubic feet annually.

(b) *Power.* Toyohashi apparently derives all its power from the grid of the area.

(c) *Gas.* Gas was supplied to the total of 959,000 cubic feet annually.

(d) *Communications.* Telephone and telegraph communications are maintained with the main Japanese systems.

**(9) Warehouses and storage.**

The Standard Oil Company maintained limited storage facilities in Toyohashi, both for oil and other commodities. A commercial supply house in the northwestern part of the city has storage facilities (FIGURE VIII-9).

**(10) Health and sanitation facilities.**

In 1938 the hospital facilities and medical personnel of Toyohashi were as follows:

Hospitals	2	Convalescent Homes	1
Beds	220	Beds	60
Doctors	15	Doctors	3
Nurses	41	Nurses	4
Pharmacists	3	Pharmacists	1

An activated sludge sewage disposal plant serves the city.

**(11) Vulnerable points.**

The railroad station, armament factory, and explosives factory are among the more vulnerable points in Toyohashi.

**82. Ōsaka Area****A. Introduction.**

The Ōsaka area is located on the southern side of west-central Honshū and extends around Ōsaka-wan at the eastern end of the Inland Sea (FIGURE VII-3). Within this area are 4 major lowlands: the Ōsaka-heiya, the Kyōto-bonchi, the Nara-bonchi, and the Ōmi-bonchi, which is the largest of the lowlands, and contains Biwa-ko, the largest freshwater lake in Japan.

The heart of the area, the Ōsaka-Kōbe-Kyōto triangle, with a population of over 8,000,000, is the principal industrial district of Japan. It includes 25% of the factory workers of Japan and normally produces more than 30% of the total value of manufactured goods of the nation. While focused principally at Ōsaka, manufacturing plants form an attenuated crescent-shaped industrial belt along the margins of Ōsaka-wan, from Kōbe on the northwest to beyond Kishiwada on the southeast. A whole host of satellite industrial cities, towns, and villages lean on the port of Kōbe and the great diversified metropolis of Ōsaka. Four of the satellites have more than 100,000 inhabitants each: Amagasaki, Fuso, Sakai, and Wakayama.

In contrast with these coastal industrial suburbs stand Kyōto and Nara, ancient political and cultural centers of inland basins.

In no other part of Japan are the transportation facilities so highly developed. The city of Kōbe is the most important port of Japan. From Ōsaka extends one of the densest rail networks of Japan. The Tōkaidō and Sanyō main lines connect the area with Nagoya, Yokohama, and Tōkyō to the east and Shimonoseki and the cities of Kyūshū to the west. The Kansai line provides an alternate route to Nagoya. A railway runs north to Tsuruga on the Japan Sea.

In the agricultural communities are terraced rice paddies watered from the thousands of small, artificial ponds. On small farms in higher parts of the area bamboo, oranges, some tea, and many vegetables are grown.

**B. Ōsaka (1940 population: 3,252,340).****(1) Importance.**

Ōsaka, the second largest city of Japan, is the leading industrial center of Japan and of the entire Orient. Outstanding among the diversified industries of the city are machinery and machine tools, anti-friction bearings, ship building and repair, chemicals and pharmaceuticals, aluminum rolling and fabrication, munitions and ordnance, electrical equipment, and copper refining; the largest single industry is the spinning of cotton yarn. There are many large factories, but much of Ōsaka's industrial importance is based on the output of a large number of small factories, which are now integrated with war production both within and beyond the area. The Ōsaka arsenal, one of Japan's largest, produces a wide range of ordnance.

Situated centrally on Honshū, Ōsaka is a major railroad center and a land-sea trans-shipment point.

**(2) Physical characteristics.**

(a) *Location.* Ōsaka lies at the northeast end of Ōsaka-wan and is built on the level delta of the Yodo-gawa and its numerous tributaries (FIGURE VII-3). A mountain range trends north-south about 13 miles east of Ōsaka harbor.

The city is intersected by many canals, especially in the central area, where they form a rectangular pattern. Conspicuous landmarks, in addition to the rivers and canals, are the pincers-like harbor breakwaters, the public buildings on Nakano-shima, Ōsaka castle, and the western-type buildings in the central business district. The city profile is low and marked by many short chimneys, particularly in the northern industrial part of the city; these are indicative of the thousands of small factories located here.

(b) *Shape and dimensions.* The city of Ōsaka is roughly elliptical with short projections extending outward along the main rail lines and rivers. Including the suburban areas, the city extends about 12 miles from north to south and at the widest point about 7 miles from east to west.

(c) *Degree of compactness.* With an average population density of about 45,000 persons per square mile, Ōsaka ranks among the 3 most densely populated cities of Japan. Most compact are the central commercial district and the mixed residential-industrial districts of northeast and southwest Ōsaka, where the population density is estimated to average 81,000 persons per square mile.

(d) *Differentiated sections.* The land-use pattern of Ōsaka is characterized by the development of well-marked districts. The predominantly residential districts are located in 3 parts of the city, the largest of which occupies the entire southeastern section. A second residential district stretches along the north bank of the Yodo-gawa. A third, more open, residential district occupies the northeastern part of the city. The central commercial district (Nakano-shima), marked by clusters of western-type buildings, occupies the center of the city west of Ōsaka castle, a section intersected by many narrow canals (FIGURES VIII-10 and VIII-11). The principal industrial plants are located in a semicircular area beginning at the mouth of the Kizu-gawa on the south, extending along the waterfront to the Yodo-gawa, and continuing eastward along the south bank of the Yodo-gawa (FIGURE VIII-12).

This simplified functional pattern is frequently broken by workers' homes interspersed among the industrial and commercial buildings, particularly along the waterfront, in the central commercial section, and northwest of Ōsaka castle. Secondary industrial concentrations are found within residential districts in the northern and south-central parts of the city.

(e) *Street plan.* The street pattern of Ōsaka is made heterogeneous by the different orientations of the many rectangular grids which compose it. The confusing pattern may be attributed partly to the absorption, in recent years, of numerous small urban communities and partly to the lack of an organized plan for the expansion of the city.

(f) *Chief open spaces.* Ōsaka is remarkably compact, and, with the exception of a few parks (FIGURE VIII-108) and certain parts of the outlying districts, lacks significant open spaces.

*(3) Means of access.*

*(a) Water.* The city of Ōsaka is readily accessible by water from Ōsaka-wan and from the north Pacific. The ap-

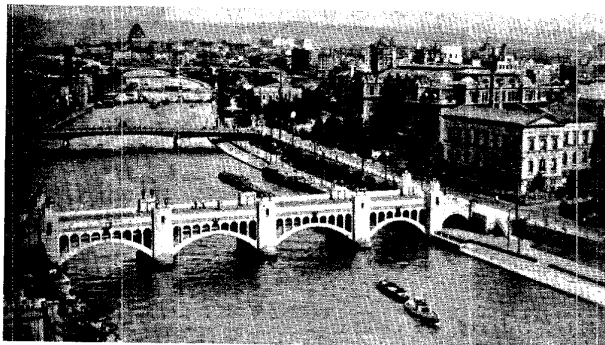


FIGURE VIII - 10. Ōsaka.

View of Nakano-shima, municipal center, showing river and bridges. 1935.



FIGURE VIII - 11. Ōsaka.

View of one of the business districts. Before 1935.



FIGURE VIII - 12. Ōsaka.

View of part of industrial section, showing tramlines in foreground and factories in background. About 1934.

proaches to Ōsaka from the north Pacific (via the Kii-suidō) are heavily fortified.

Enlargements and the provision of modern equipment and facilities have permitted Ōsaka to take third rank among Japan's foreign-trade ports. It occupies an important position as the home port of many coasting and ocean-going steamers, although the largest trans-Pacific liners are not able to use the port. The harbor, which is entirely artificial, consists of an inner and outer basin; the latter is protected from the sea by 2 large breakwaters. Over 1,200 acres of land have been reclaimed on the foreshore for building lots. The port has been expanded and modernized in recent years, but is congested with large warehouses, most of which are now probably used for military supplies.

*(b) Rail.* Ōsaka is the center of an extensive system of railways, including the Tōkaidō main line which connects the city with Kyōto, Nagoya, and Tōkyō on the east, and with Kōbe and other cities on the Inland Sea to the west. The Kansai line is an alternate route to Nagoya, and numerous electric lines radiate from the city. A rail line also extends to Tsuruga on the north coast of Honshū.

*(c) Road.* Four first-class roads provide access to Ōsaka. One extends from Kōbe to Ōsaka, another from Kyōto to Ōsaka, a third from Wakayama to Ōsaka, via Kishiwada and Sakai, and the fourth runs from Hashimoto to Ōsaka. A second-class road extends from Nara to Ōsaka.

*(d) Air.* Ōsaka is an important air center. Regular passenger service from Ōsaka is maintained by several air lines. The airfield of the Japan Air Transport Company, located across the Kizu-gawa from the Fuji Nagata shipyards, is now used by Japanese military aircraft.

*(4) Billeting facilities.*

Ōsaka castle is headquarters of the 4th Army Division. There are many barracks in and around the arsenal and castle grounds. The 252 municipal primary schools and the other schools of the city might also be used for billets. Many hotels serve the city, among them the Hotel New Ōsaka with 230 rooms (FIGURE VIII-13).

*(5) Buildings.*

Most of the buildings (perhaps 90%) are constructed of wood and plaster; the remainder are brick, sheet metal, stone, and concrete. Many buildings in the commercial sections of town are of modern, westernized construction (FIGURE VIII-14). Among the more important buildings are:

Hotel New Ōsaka (FIGURE VIII-13).

Ōsaka prefectural office (FIGURE VIII-15).

Ōsaka arsenal, including numerous buildings and barracks (FIGURE VIII-108).

Gendarmerie.

Ōsaka railway station (FIGURE VIII-16).

Mint.

Broadcasting building (FIGURE VIII-17).

The municipality has built a number of dwelling houses and hotels to relieve the scarcity of living quarters produced by the commercial boom. Five 3-story hotels of reinforced concrete construction and 1,561 houses have been built in this building program.

*(6) Internal transportation.*

*(a) Subway.* A modern subway is operated by the Keihan

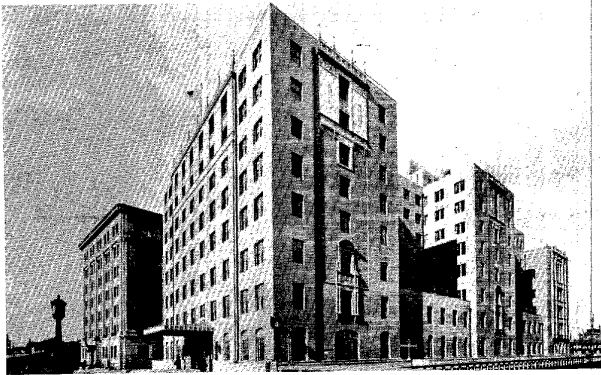


FIGURE VIII-13. *Ōsaka.*  
Ōsaka Hotel, near railway station.

Electric Railway Company, Limited (FIGURES VIII-18 and VIII-19).

(b) *Tram.* Ōsaka is provided with an extensive tram service directly managed by the municipality. In 1938, there were 66 miles of operating line (FIGURE VIII-108), with 796 cars in operation.

(c) *Road.* Roads in the downtown commercial and industrial sections are well surfaced, but many of the less important roads are still narrow and poorly surfaced.

(d) *Canal and river.* Twelve rivers and 4 canals flow through the city, providing cheap transportation to factories. These rivers and canals have made necessary the construction of many bridges (1,631 in 1928). There are at least 33 points at which ferry service is maintained under supervision of the municipality.

(7) *Repair and service facilities.*

The Fujinagata Ship Building Company (units 1 and 2), the Ōsaka Iron Works (units 1 and 2), and the Ōsaka Shipbuilding Works are located at Ōsaka (FIGURE VIII-108). These yards rank among Japan's most important ship repair yards. They specialize in the production of marine engines.

As an important rail center, Ōsaka has extensive repair facilities for rail and tram equipment. The Rolling Stock Manufacturing Company and the Ōsaka railway station have large repair shops.

There are numerous manufacturers of machinery and machine tools, as well as other iron and steel industries in Ōsaka (FIGURE VIII-108). The more important are:

- Sumitomo Metal Industry.
- Ōsaka Steel Manufacturing Company.
- Kurimoto Iron Work.
- Yamato Steel Works.
- Kubota Iron and Machinery Works.
- Hatsudoki Engine Works.
- Toyowa Heavy Industry Company.
- Kwoyo Precision Works Company.
- Nakayama Steel Works, Ltd. (FIGURE VIII-20).

(8) *Public utilities.*

(a) *Water.* The Ōsaka water supply plant is located in the northern part of the city just north of the confluence of the Yodo-gawa and the Aji-kawa (FIGURE VIII-108). Some of the buildings of the plant are brick with tile roofs, while others are constructed of reinforced concrete. The plant area is landscaped and resembles a park.



FIGURE VIII-14. *Ōsaka.*  
One of Ōsaka's modern department stores, 1938.

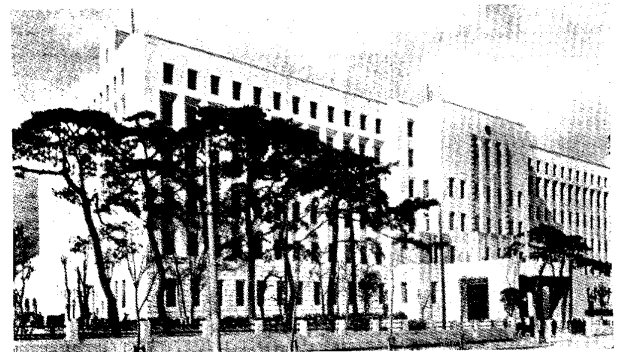


FIGURE VIII-15. *Ōsaka.*  
Prefectural buildings. About 1932.

Water for the city comes from the Yodo-gawa, which runs through the northern part of the city. Almost the entire supply is taken from the river at Shibashima, 20 miles downstream from the point where Kyōto's sewage is emptied. In 1938, the daily supply of water was about 227,500,000 gallons.

(b) *Power.* The 2 largest generating plants in Japan are located at Amagasaki, a suburb of Ōsaka. These plants, which are part of the central Honshū network, constitute an important year-round source of power for Ōsaka. Power can also be diverted to Ōsaka from the Tōkyō network when needed.

(c) *Gas.* The Ōsaka Gas Company, located at the confluence of the Kizu-gawa and Shirinashi-kawa, produces gas as a by-product of coke.

(d) *Communications.* Domestic and foreign mail, telephone, telegraph, and cable services are available.



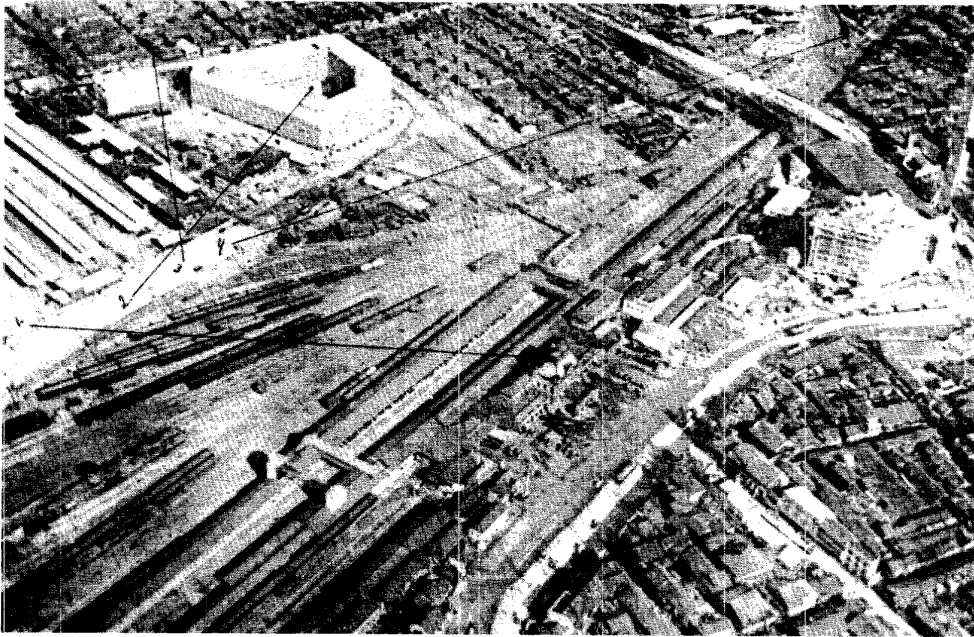


FIGURE VIII - 16. *Osaka*.  
Railway station and yards, 1932.

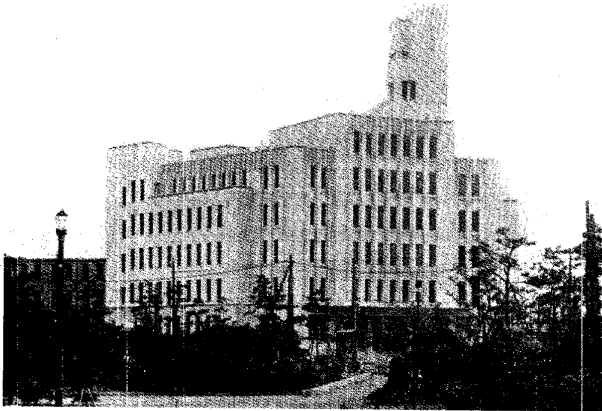


FIGURE VIII - 17. *Osaka*.  
Osaka Broadcasting Building (opened in 1936).

**(9) Warehouses and storage.**

Numerous warehouses are located in the harbor area and along canals in the industrial section of Osaka.

**(10) Health and sanitation facilities.**

(a) *Hospitals and medical personnel.* Osaka has many hospitals, of which the more important are:

Citizens' Hospital, 4-story ferro-concrete building, 500 beds.  
Municipal Sanatorium, 2-story wooden building, 350 patients.  
Monyama Isolation Hospital, 720 in-patients.  
Osaka Medical College Hospital.  
Red Cross Hospital.  
Saiseikai Hospital (charity hospital).  
Kaisei Hospital (private).  
Ogata Hospital (private).

Following is a table listing hospitals and medical personnel in 1937:



FIGURE VIII - 18. *Osaka*.  
One of the main arteries. The subway runs below this street.  
Before 1935.

*Hospitals	173
Physicians	3459
Dentists	1469
Pharmacists	3137
Population per physician	970

Crematoria and cemeteries are all under municipal control. Refuse is collected at regular intervals and destroyed at one of

\*Hospitals for in-patients only. Clinics and consulting offices not included.



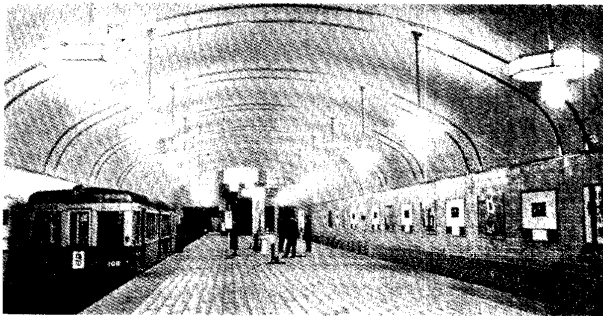


FIGURE VIII-19. *Osaka.*  
Interior of Osaka subway, 1935.

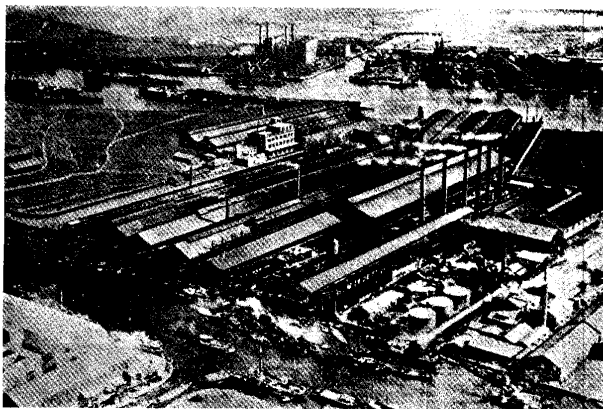


FIGURE VIII-20. *Osaka.*  
View of Nakayama Steel Works, Ltd., one of Osaka's large steel works, 1935.



FIGURE VIII-21. *Kobe.*  
View showing elevated railway, mountains which confine city to coastal shelf, and low skyline of city.

the 3 main incinerator stations. These 3 stations, which are operated by the city, consist of 72 incinerators.

(b) *Sewage disposal.* There are 3 sewage treatment plants in Osaka; the Tsumori plant is located on the Kizu-gawa in the south-central part of the city. The Ebiye plant, which serves the northwestern part of the city, is on the Yodo-gawa and the Ichioka plant is in the west-central part of the city. Two other plants have been planned but it is not known whether they have been completed.

#### (II) *Vulnerable points.*

Population density, congestion, and combustible construction combine to make the city vulnerable to sweeping fires. Moreover, it is characterized by a very large number of small industrial establishments, many of which are integrated as "shadow plants" into both local and national war production. These plants tend to cluster in mixed industrial-residential sections of the city, where they are crowded by combustible houses.

The industrial areas are largely along the water fronts and are flanked by crowded wooden structures. Key industries in Osaka, whose destruction would seriously affect Japanese war economy are:

- Sumitomo Metal Industry and Aluminum Company.
- Fujinagata Shipbuilding Company.
- Amatsuji Steel Ball Manufacturing Company.
- Sumitomo Electric Industries.
- Japan Dyestuff Manufacturing Company.
- Osaka Arsenal.

#### C. *Kobe (1940 population: 967,234).*

##### (1) *Importance.*

Kobe is the principal port and the sixth largest city of Japan. The city is also a major center for industries related to its port functions, and alone handled about 40% of the export and import trade of Japan. The shipyards represent Japan's largest concentration of shipbuilding and marine engine capacity. The production of steel, electrical equipment, and machinery is closely integrated with shipbuilding, and many important ship components are produced in the city. Railway equipment, rubber tires, and ordnance are also produced. Unlike most other Japanese cities of comparable size, Kobe has few small industrial plants (FIGURE VIII-109).

##### (2) *Physical characteristics.*

(a) *Relation to surface features.* Kobe occupies a long, narrow strip of land on the northern side of Osaka-wan, flanked on the north by the high, wooded Rokko-zan (mountains) and on the south by Osaka-wan (FIGURE VII-3). This mountain range parallels the coast, and trends northeastward beyond Kobe. Conspicuous landmarks in the city include the waterfront piers and breakwaters, the elevated Tokaido railway, the western-type buildings of the central business district, and the clusters of large factories at the west, east, and southwest of the city (FIGURES VIII-21 to VIII-23).

(b) *Shape and dimensions.* Kobe's area is 83 square kilometers (33 square miles). The densely built-up part of the city is about 10 miles long but only 2 to 3 miles wide.

(c) *Degree of compactness.* With an overall population density of 30,500 persons per square mile, Kobe ranks among the 3 most densely populated cities of Japan.

(d) *Differentiated sections.* The restricted area of level land between the waterfront and the flanking hills has shaped the pattern of land use. The industrial plants are located near the waterfront and at the east and west margins of the densely built-up part of the city. Predominantly residential districts extend along the outer northern, eastern, and western sides of the city. The commercial district is located just northwest of the central harbor piers and south of the elevated railroad line which runs the length of the city. Prefectural and municipal offices, as well as military buildings, are located north and west of the commercial district.

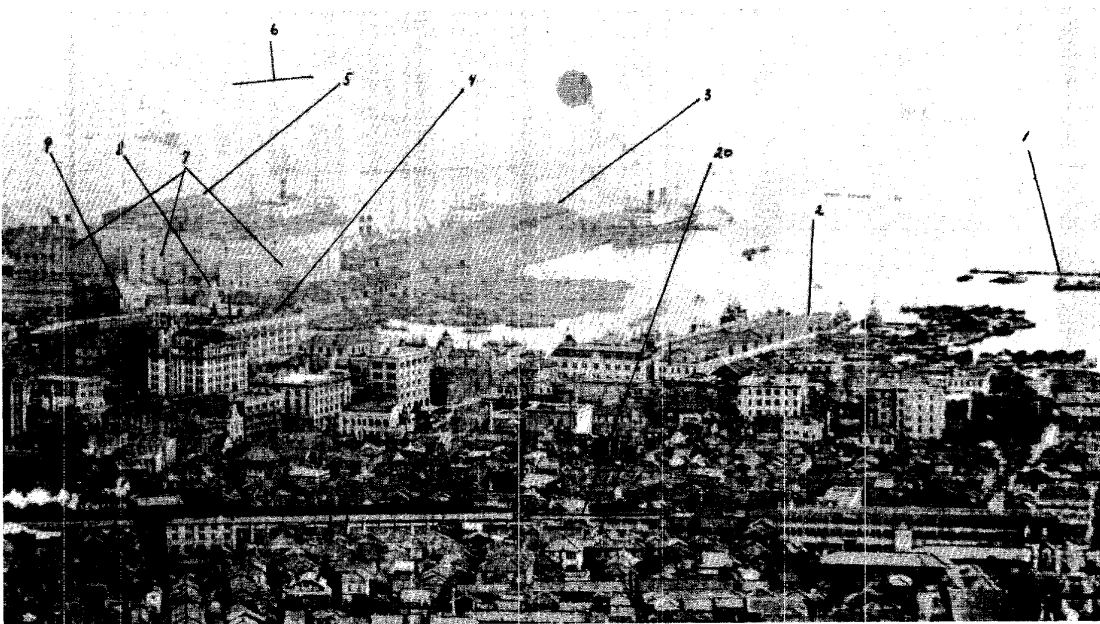


FIGURE VIII-22. *Kobe*.  
Panoramic view. Looking S.

- |                    |                                      |
|--------------------|--------------------------------------|
| 1. Meriken Hatoba. | 6. Entrance in breakwater.           |
| 2. Customs Wharf.  | 7. Warehouses.                       |
| 3. Wharf No. 1.    | 8. Marine building.                  |
| 4. O.S.K.          | 9. Chamber of Commerce and Industry. |
| 5. Wharf No. 2.    | 20. Tokaido Main Line.               |

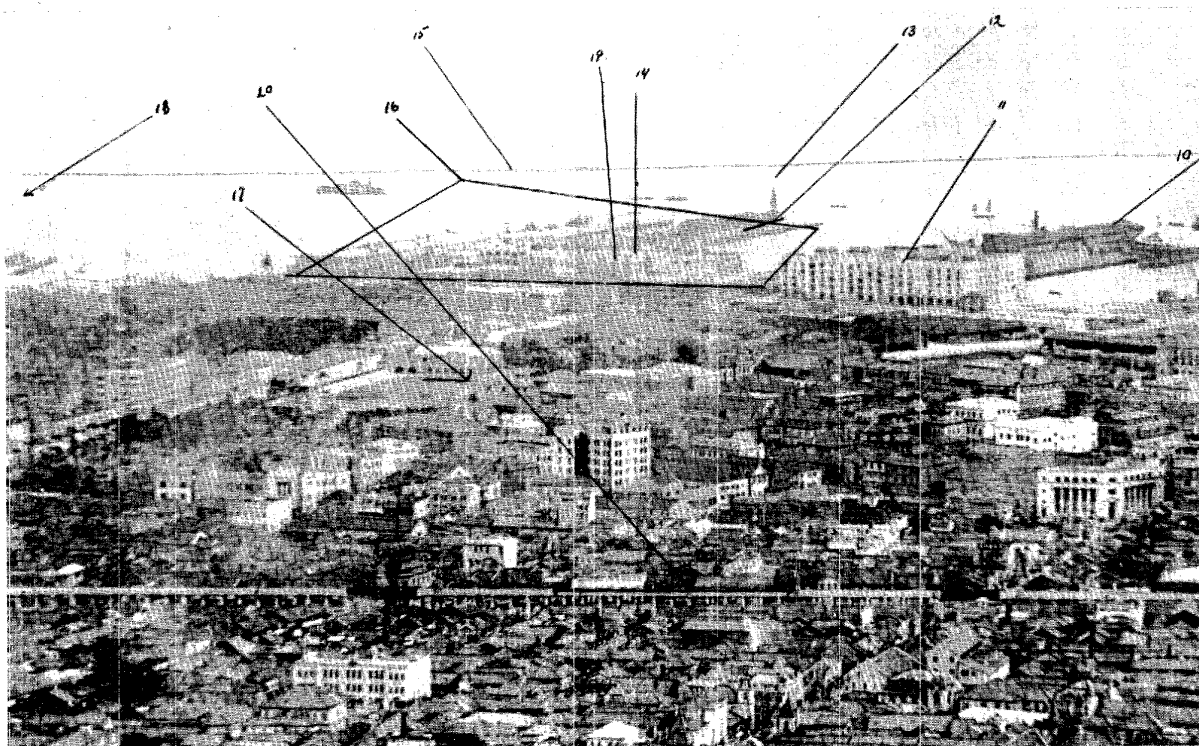


FIGURE VIII-23. *Kobe*.  
Panoramic view. Looking S.

- |                          |                                     |
|--------------------------|-------------------------------------|
| 10. Wharf No. 3.         | 16. Toshim warehouses.              |
| 11. Warehouses.          | 17. Sannomiya police station.       |
| 12. Wharf No. 4.         | 18. Kobe steel works (not visible). |
| 13. Marine signal tower. | 19. Baggage examination office.     |
| 14. Customs house.       | 20. Tokaido Main Line.              |
| 15. Breakwater.          |                                     |

(c) *Street plan.* The over-all street pattern of Kōbe is roughly rectangular, although this pattern breaks down in many parts of the city.

### (3) Means of access.

(a) *Water.* Kōbe has the most extensive port facilities in Japan. The deep harbor is excellent and is protected by 3 breakwaters. Kōbe is the deep-water port of Ōsaka, and ships of any draft may anchor there. The approaches to Kōbe are heavily fortified.

(b) *Rail.* In Kōbe, the Tōkaidō main line route to Ōsaka, Kyōto, Yokohama, and Tōkyō connects with the Sanyō main line route to Shimonoseki and to Kyūshū Island via the Kammon tunnel. Kōbe is easily reached by rail from all land directions.

(c) *Road.* A national highway runs through Kōbe, providing access from Himeji to the west, and from Ōsaka, Kyōto, and Tōkyō to the east. It is the only good road connecting Kōbe with other cities.

(d) *Air.* An army emergency landing ground is believed to be located in Kōbe, near the railway station. Fighter airfields are located at the nearby cities of Akashi and Amagasaki.

### (4) Billeting facilities.

There are more than 200 hotels and about the same number of lodging houses in Kōbe. Nearly all have small capacities. Among those which would be of some use for billeting purposes are the Oriental Hotel, the Tor Hotel, the Fuji Hotel, the Tansan Hotel (50 rooms), and the Yamato Hotel. There are 65 municipal elementary schools and 17 high schools which might be used for billeting.

### (5) Buildings.

The predominant construction materials are wood and plaster. Only about 10% of the buildings are constructed of brick, sheet metal, stone, or concrete (FIGURE VIII-24). Among the more important buildings are the following:

- Sannomiya railway station (FIGURE VIII-25).
- Prefectural office.
- Telephone and Radio Central building.
- Municipal offices.

### (6) Internal transportation.

(a) *Subway.* Kōbe has a modern subway (PLAN VIII-3).

(b) *Tram.* Kōbe has only 31 kilometers (19.5 miles) of operating tram lines and 275 cars in service (FIGURE VIII-26).

(c) *Road.* A national highway passes through the center of town, and other roads suitable for motor traffic run through the downtown district.

Motorbusses operate in the city over a route 69.8 kilometers (43.5 miles) long. Many of the gasoline-operated busses have been converted into charcoal-burners. Taxis are plentiful.

### (7) Repair and service facilities.

Marine repairs of all types can be made at the extensive shipyards of Kōbe. Among the most important are the Mitsubishi Heavy Industries Company and the Kawasaki Heavy Industries Company.

The Kawasaki Locomotive and Car Company and the Sannomiya railway station (FIGURE VIII-109) have equipment for repairing railway apparatus. The Imperial Government Railway shops are also located in Kōbe near the Takatori station.



FIGURE VIII - 24. Kōbe.  
Theater street.



FIGURE VIII - 25. Kōbe.  
Sannomiya railway station, 1936.



FIGURE VIII - 26. Kōbe.  
Commercial section, showing tranline in foreground.

There are a number of iron and steel works in Kōbe at which heavy machinery may be repaired.

Small garages, located throughout the city, have repair facilities.

### (8) Public utilities.

(a) *Water.* From 3 reservoirs in the Rokko-zan area, the municipality, in 1935, supplied filtered water to about 85% of its 198,018 households. The amount supplied represents a daily per capita consumption of 42 gallons.

(b) *Power.* Kōbe is connected with the central Honshū power network which extends from Himeji to the Tōkyō network. The steam power plants at Amagasaki serve as an auxiliary electrical power supply.

(c) *Gas.* Gas was supplied to 133,448 families in 1937.

(d) *Fire-fighting equipment.* Fire hydrants are well distributed, and fire-fighting equipment is of modern type. How-

ever, water supply and water pressure do not leave a large margin of safety.

Many of the large factories and business firms have their own wells, though wells with large and constant flow are relatively rare, and are, for the most part, concentrated in the northwest quarter of the city. In some department stores, warehouses, and public offices, sprinkler systems have been installed.

(c) *Communications.* Telephone and telegraph service are available throughout Kōbe, and a number of radio stations are located in the city.

#### (9) *Warehouses and storage.*

Most warehouses are located on the waterfront. The sheds are mainly constructed of iron frame covered with corrugated iron sheets. The older warehouses are built of mud plaster and brick, with tile roofs. All the new warehouses are of modern design, are constructed of reinforced concrete, and have such modern devices for protection from fire as automatic-sprinkler systems and fire doors. Most of the warehouses are served by steam or electric locomotives. The area covered by warehouses was 146,803 *tsubo* (about 585,600 square yards).

#### (10) *Health and sanitation facilities.*

In 1938, hospital and medical personnel facilities were as follows:

Hospitals	80
Physicians	903
Dentists	385
Pharmacists	723
Nurses	4,077

A sewage disposal system is in operation, but sewage disposal is difficult because of the low elevation of the city.

#### (11) *Vulnerable points.*

Following are some of the more vulnerable points in Kōbe:

- Telephone exchange.
- Railway station.
- Kōbe Steel Works.
- Hawasaki Dockyards.
- Mitsubishi Dockyard Company.

The most inflammable part of the city is that extending along both sides of the Tōkaidō main line, and is bounded on the east by a cluster of conspicuous steel and rubber plants and on the west by the Shimminato-gawa. This zone includes government and commercial buildings, as well as the most congested residential districts.

### D. Kyōto (1940 population: 1,089,726).

#### (1) *Importance.*

The strategic importance of Kyōto (FIGURE VIII-27), located 20 miles northeast of Ōsaka in the Kyōto-bonchi, is derived from its key location at the focus of the rail network which serves north-south and east-west traffic on Honshū.

Kyōto was a peacetime center for handicraft industries and textile production, but had few large factories. Many factories have shifted to war products—small lacquer manufacturers to explosives and rayon factories to cellulose nitrate, for example. The Simado Seisakusho plant, just west of Kyōto, produces X-ray equipment, electrical appliances, and most of the Japanese submarine batteries.

Kyōto is important as a cultural and religious center for Japan. For 11 centuries prior to 1868 it was the imperial residence. It is now the seat of many important cultural institutions.

#### (2) *Physical characteristics.*

(a) *Location.* Kyōto lies on the northern margin of the Kyōto-bonchi, which is flanked by mountains on the north, east, and west (FIGURE VIII-28). It faces larger plains on the south and is crossed by the Kamo-gawa (river) on the east (FIGURE VIII-29); along its western margin flows the Katsura-gawa.

(b) *Shape and dimensions.* The area of Kyōto is 288.65 square kilometers (approximately 111 square miles); its shape is roughly rectangular. Around the Imperial Palace (FIGURE VIII-27), in the center of the city, is a rectangular grid of north-south, east-west streets, but the street pattern in the outskirts is irregular.

(c) *Functional areas.* Kyōto is less westernized than the other great cities of Japan and does not have distinctly differentiated functional areas (FIGURE VIII-30); many residential sections merge with commercial areas (FIGURE VIII-31).

#### (3) *Means of access.*

(a) *Water.* The Yodo-gawa is navigable from Ōsaka to Kyōto and provides cheap transportation between these cities.

(b) *Rail.* Kyōto is situated on the Tōkaidō main line (FIGURE VIII-32). This line provides excellent connections with Nagoya, Yokohama, Ōsaka, and Nara. The main station and railroad yards are in the southern section of the city. A



FIGURE VIII-28. Kyōto.

View of business district, showing tramlines and mountains confining city in background.

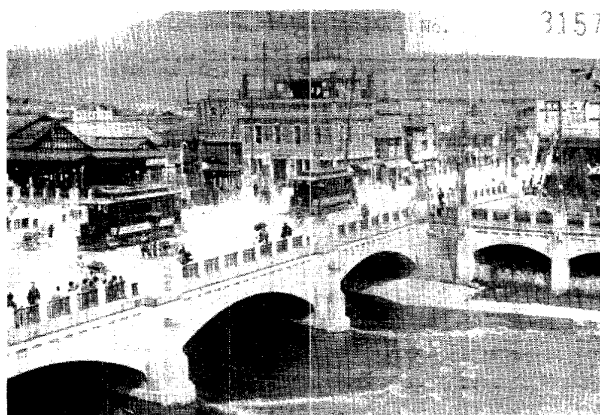


FIGURE VIII-29. Kyōto.

View in eastern Kyōto, showing bridge over Kamo-gawa, wide street, tramlines, and mountains in background.

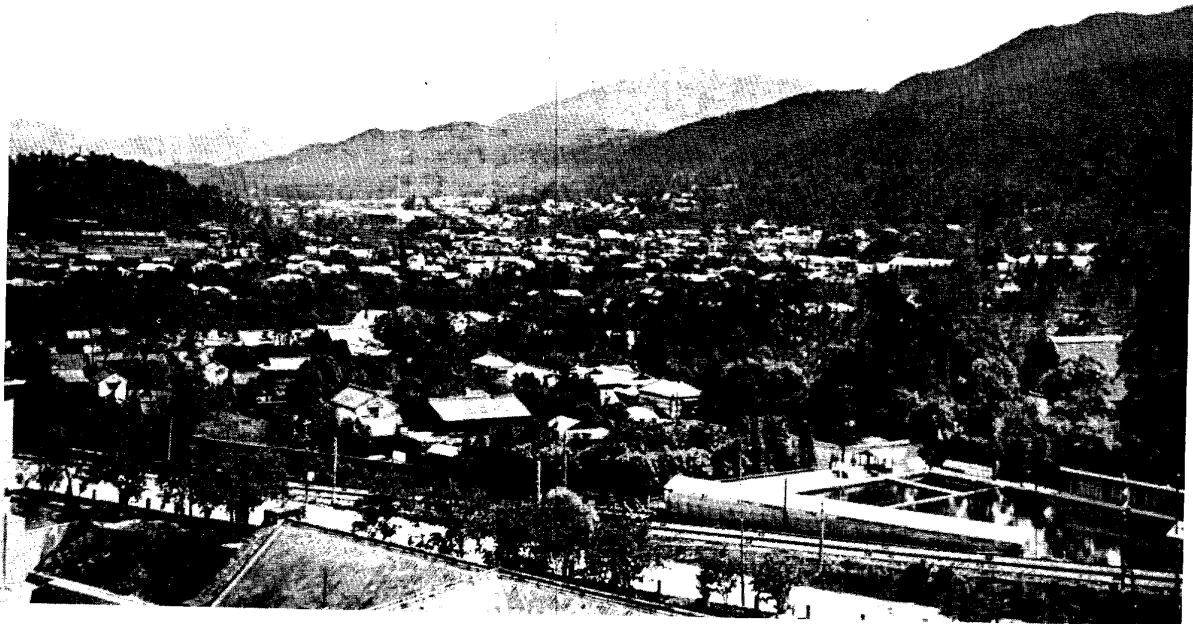


FIGURE VIII - 30. *Kyōto*.  
General view.



FIGURE VIII - 31. *Kyōto*.  
View of mixed commercial and residential district.

network of urban electric railway lines link *Kyōto* with Ōsaka, Nara and Ōtsu. Other electric lines connect *Kyōto* with western and northwestern Honshū.

(c) *Roads*. Numerous motor roads serve *Kyōto*. A first-class highway connects *Kyōto* with Ōsaka, Kōbe, and Himeji, on the south and west, and with Nagoya, Yokohama, and Tōkyō on the east and north. Other roads lead south to Nara and north to Tsuruga and cities and towns bordering on the Japan Sea.

#### (4) *Billeting facilities.*

In the southeastern section of the city barracks for 5 regiments and the divisional headquarters are located. In addition to these billeting facilities, there are at least 8 hotels in *Kyōto*, including the Eizan Hotel with 120 rooms, the 9-story *Kyōto* with 100 rooms, the *Kyōto* Station Hotel with a capacity of 138, and the Miyako Hotel, accommodating 140 persons. The *Kyōto* University, the medical school, technical institutions, numerous secondary schools, and the Y.M.C.A. building might be suitable for billeting.

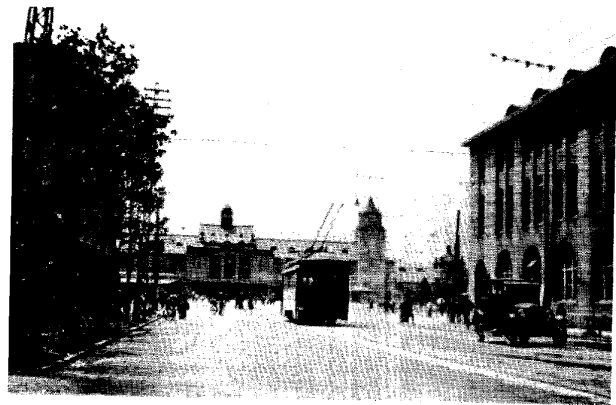


FIGURE VIII - 32. *Kyōto*.  
Railway station, 1928.

#### (5) *Buildings* (FIGURES VIII-27 and VIII-31).

Although occidental-style buildings are common in the commercial nucleus, they do not predominate. The more important buildings are:

Prefectural Office  
Kyōto Municipal Office.  
District Court.  
The Old Imperial Palace.  
Nijo Detached Palace.  
Higashi and Nishi Honganji  
Temple.

Yamanaku Art Gallery.  
Kyōto Industrial Museum.  
Commercial Museum.  
Industrial Laboratory.  
221 Shinto shrines.  
889 Buddhist temples.

#### (6) *Internal transportation.*

Extensive tramway lines serve *Kyōto*. A subway on the east runs  $\frac{3}{4}$  mile towards the center of the city.

#### (7) *Public utilities.*

(a) *Water*. The municipal waterworks supplies 93% of



the population with water; the total daily supply per capita is 30 gallons. Most of the water is drawn from Biwa-ko (lake). Two canals connect the city with the lake; one is used exclusively for drinking water, the other for hydroelectric power and for water supply. The water system serving Kyōto includes 2 purification plants and 2 reservoirs.

(b) *Power.* Electric power in Kyōto is supplied by the Ōsaka-Nagoya grid.

(c) *Communications.* Kyōto has telephone and telegraph connection with the main Japanese systems.

#### (8) *Health and sanitation facilities.*

In 1937, the hospital and medical personnel facilities were as follows:

Hospitals	86	Pharmacists	122
Physicians	1,475	Nurses	1,391
Dentists	487		

The large Red Cross and University hospitals are included in this group.

Kyōto has a modern sewage disposal system which discharges processed sewage into canals and the Kamo-gawa. It is believed that only a small proportion of the population is served by this system. Gutters on both sides of the streets provide open drainage.

#### (9) *Vulnerable points* (FIGURE VIII-17).

Airplane factory southeast of Kyōto.

Kyōto railroad station and yards (in the southern district).

### E. Wakayama (1940 population: 195,203).

#### (1) *Importance.*

Wakayama is a cotton-spinning town, strategically located

on the base of the peninsula commanding the entrance of Ōsaka-wan (FIGURE VIII-33). It has excellent steam and electric railway connections with Ōsaka and the south of the peninsula.

#### (2) *Physical characteristics.*

Wakayama is about 30 miles due south of Kōbe and 40 miles southwest of Ōsaka, at a point where the coastal plain on the eastern shore of Ōsaka-wan broadens to a width of 6 to 8 miles.

#### (3) *Means of access.*

The shallow harbor, as a result of silting, can be used only by small motor-driven fishing boats. Wakayama can be reached from Ōsaka by electric railway and by a first-class highway, which continues to the end of the peninsula.

#### (4) *Internal transportation.*

There is a tram line (FIGURE VIII-38).

#### (5) *Public utilities.*

Water is obtained from Kino-kawa (river) and from approximately 43,000 dug wells. The per capita consumption of filtered water is 30 gallons per day. Electricity is supplied by the Central Honshū network. Gas is available.

#### (6) *Health and sanitation.*

Following are the statistics on hospitals and medical facilities in Wakayama:

Hospitals	1
Doctors	14
Nurses	43
Pharmacists	5

A modern sewage disposal system was being planned in 1940.

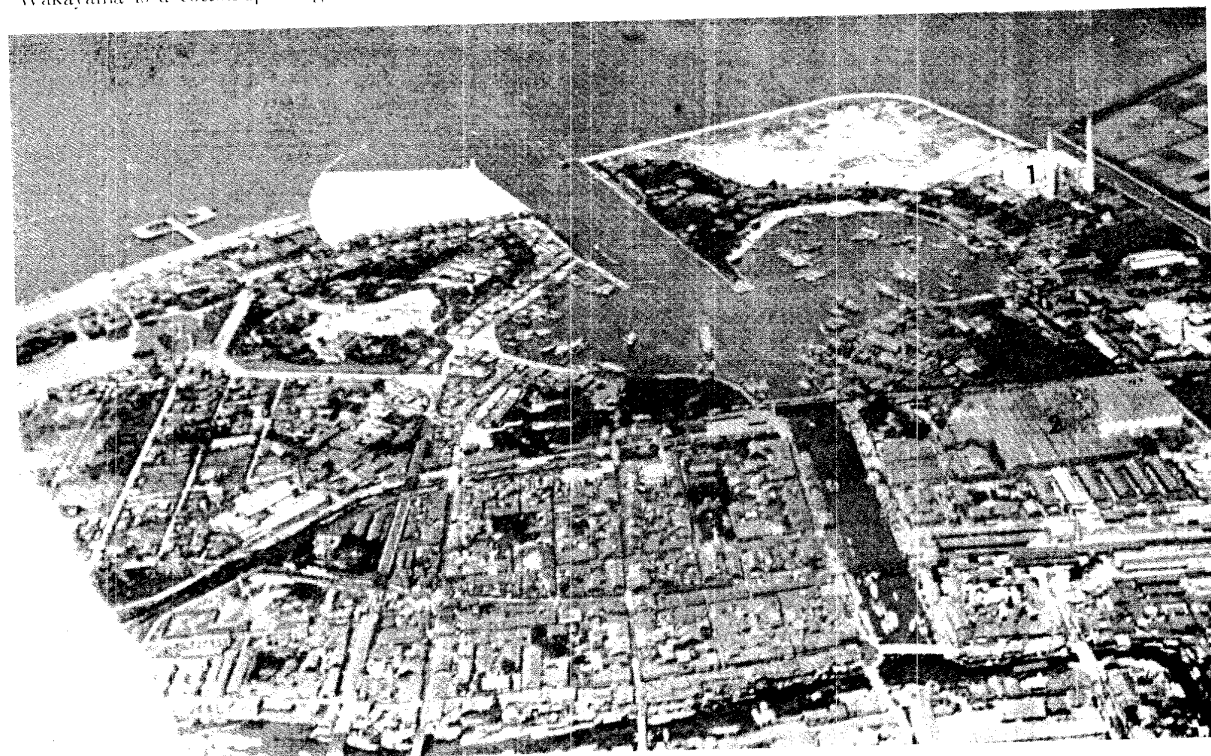


FIGURE VIII-34. Sakai.

Aerial view of city and harbor. Looking W. 1. Power plant. 2. Textile factory.



FIGURE VIII - 36. Amagasaki.  
View of city. Looking N. 1935.

**F. Sakai (1940 population: 182,147).**

**(1) Importance.**

Sakai is an industrial center in the Ōsaka region, specializing in cotton-spinning, weaving, bleaching, and chemical manufacture, especially of picric acid.

**(2) Physical characteristics.**

Sakai is situated on Ōsaka-wan 3 miles south of Ōsaka (FIGURE VIII-35). The most densely built-up district is located inland, in the center of the city, and trends northeast-southwest. It is intersected by the main highway, which runs south. There are small factories in the center of town, and on the eastern and southern outskirts.

**(3) Means of access.**

An active traffic is carried on by small craft, but the port is closed to large steamers because of silting, which followed the change of course of Yamato-gawa (FIGURE VIII-34). Sakai is on the main railway line running south from Ōsaka to Wakayama, and is connected with the interior by a road, terminating at Hashimoto, as well as by electric railway.

**(4) Internal transportation.**

An electric railway runs through the center of town, and has a branch extending west-northwest to wharves and warehouses. Several controlled stream canals in the western section of the town empty into the harbor.

**(5) Public utilities.**

Water is obtained from the Ōsaka water system and from local bored wells. Per capita consumption is 30 gallons per day.

**(6) Health and sanitation.**

Hospitals and medical facilities in Sakai are as follows:

Hospitals	2
Beds	222
Doctors	32
Nurses	82
Pharmacists	13

Sewage is discharged into canals and into the bay.

**(7) Vulnerable points.**

Sakai station and railroad yards.  
Seaplane hangars south of city on coast.

**G. Amagasaki (1940 population: 181,011).**

**(1) Importance.**

Amagasaki is principally important for its huge steam power plants, which are located on an island in the harbor; these supply



FIGURE VIII - 38. Amagasaki.  
View of city. Looking N. 1935.

power to Kōbe and Ōsaka. The city is an industrial center producing iron and steel, electrical equipment, and machinery. There is a large oil refinery southwest of the city.

### (2) *Physical characteristics.*

Amagasaki is a northwestern suburb of Ōsaka on Ōsaka-wan. Most of its industrial plants are located near the waterfront. Its main residential district, as well as scattered commercial buildings, is in the "Y" formed by the main channel of the harbor and its branches. A cluster of public buildings occupies the southwestern portion of the district. There is a high degree of population density and congestion (Figures VIII-36 and VIII-37), with an average of 29,600 persons per square mile.

### (3) *Means of access.*

The harbor of Amagasaki is reached through a dredged channel from Ōsaka-wan. The docks can accommodate 6 medium-sized ships.

Amagasaki is on a good highway and on electric railways and the Tōkaidō railway, which runs from Ōsaka to Kōbe. It is connected with the northern interior by the Fukuchi-yama Line.

There is a commercial airfield on the northern outskirts of the city.

### (4) *Public utilities.*

About 457,000 cubic feet of water are supplied annually. Two of the largest generating stations in Japan are located on a small island in the harbor.

### (5) *Health and sanitation.*

Following are the statistics on hospitals and medical facilities in Amagasaki:

Hospitals	at least 1
Beds	74
Doctors	2
Nurses	4
Pharmacists	1

Sewage is discharged into the river.

### (6) *Vulnerable points.*

Amagasaki power plants.

Oil refinery.

Airport.

Such cities as Okayama, Kure, Hiroshima, and Tokuyama, on the coast of southwestern Honshū, are important army and navy towns. Hiroshima and Kure, in particular, are large naval bases and have naval industries of great magnitude. Industry is also important in these cities and in the Shikoku cities of Matsuyama, Niihama, and Takamatsu, on the other side of the Inland Sea. Textiles, rubber, chemicals, processed foods, and petroleum products are a few of the more important industrial products of these cities.

The Inland Sea area has a mild, subtropical climate favorable for year-round military training and for agriculture. Fishing and rice-cultivation are the 2 most important food industries. Agriculture is closely confined to narrow coastal plains, river valleys, and the larger islands of the Inland Sea.

## B. Okayama (1940 population: 163,552).

### (1) *Importance.*

Okayama, one of the important cities of the Inland Sea area, is diversified, having industrial, commercial, and military activities. Okayama produces a wide variety of manufactured products, such as textiles, chemicals, ships, wheels, iron tools, fertilizer, agricultural tools, and sake. It is also a domestic-trade port of importance, and a training center for troops.

### (2) *Physical characteristics.*

(a) *Location.* Okayama is located on the delta of Asahi-gawa about 100 miles west of Osaka and several miles inland.

(b) *Shape and dimensions.* Okayama is elongated from north to south, and also has an extension to the west, across Asahi-gawa.

(c) *Degree of compactness.* Okayama has thrown out numerous tentacles into the countryside in all directions. These developments are sparsely built up but are integrated with the central urban area of Okayama.

(d) *Differentiated sections.* Factories are located along the railroad line (the Sanyō) and along the shores of the Asahi-gawa. The commercial section is in the northern part of the city.

(e) *Street plan.* The street plan is rectangular but highly irregular. The alignment is roughly east-west, north-south.

(f) *Open spaces.* There are numerous parks within the city connected with shrines and temples. One mile from the railroad station is Kōraku-en Park, situated on the east bank of Asahi-gawa.

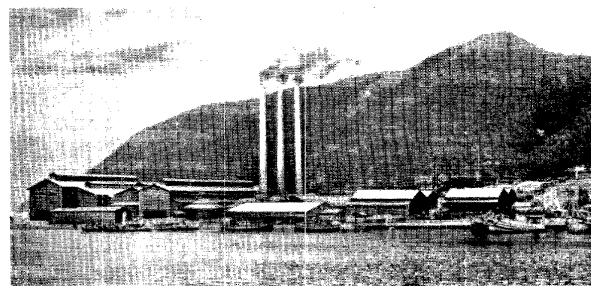


FIGURE VIII - 39. Okayama.  
Chemical factory, 1936.

### (3) *Means of access.*

(a) *Rail.* Okayama is 80 miles west of Kobe by rail, via the Sanyō. By a roundabout rail line extending 20 miles to the

## 83. Inland Sea Area

### A. Introduction.

The cities distributed along the Inland Sea coast of southwestern Honshū and northern Shikoku (Figure VIII-105) comprise an important group of Japanese urban concentrations. The many excellent harbors of this coast and the natural protection of the waters of the Inland Sea have contributed to the military, commercial, and industrial importance of these cities. Most of the important cities of the area are located on a coastal plain which skirts the margins of the Inland Sea; cities are found on deltas where this plain widens, and up the river valleys.

The cities along the Inland Sea are unified by an excellent rail system, but, more important, the sea itself is a route for ocean-going steamers and smaller vessels engaged in a highly developed interisland domestic trade. Hydroelectric power is abundant throughout the area.



south, Okayama is connected with its port town of Uno, which was incorporated in the new town of Tamano formed in 1940. From this port, the ferry runs to Takamatsu in Shikoku. To the west, Okayama is connected by the Sanyō with Kure and the other cities of the Inland Sea coast. A rail line runs to the north-coast city of Tottori. This line connects with the Sanin main line.

(b) *Air.* An army airport with underground hangars is located near Okayama.

#### (4) *Billeting facilities.*

Barracks for workers are located in the western part of the city. In the northwest, near the ordnance depot, are barracks for cavalry and infantry troops. Schools and temples are numerous throughout the city.

#### (5) *Buildings.*

A large railroad roundhouse is located in the western part of the city. To the north of it are 2 railroad stations of the Sanyō line. In the northeastern section of the city is located the large Kurashiki Spinning Mill and Okayama castle, the latter a conspicuous landmark. The ordnance depot is located near the spinning mill. South of Okayama station, in the western part of the city, are the Kanegafuchi Spinning Mill, a government tobacco plant, and an electric railroad power plant. Along Asahi-gawa in the southwestern part of the city is the Okayama Gas Company plant, the Okayama Electric Power plant, the Okayama Textile Company, and several chemical plants (FIGURE VIII-39). North of these is a large powder storehouse.

#### (6) *Internal transportation.*

Bus and street car lines serve the city.

#### (7) *Repair and service facilities.*

All types of light machinery, including aircraft, can be repaired at Okayama.

#### (8) *Public utilities.*

(a) *Water.* Water is supplied throughout the city. The annual total is about 10,682,000 cubic feet.

(b) *Gas.* The Okayama Gas Company supplies about 4,719,000 cubic feet of gas annually.

(c) *Communications.* Okayama is connected by the general systems of telephone and telegraph with the other cities of Japan.

#### (9) *Warehouse and storage.*

The Okayama railroad yards, in the western part of the city, include large warehouses normally used for freight.

#### (10) *Health and sanitation facilities.*

The following data are for 1938:

Hospitals	3	Convalescent Homes	1
Beds	133	Beds	65
Doctors	18	Doctors	3
Nurses	38	Nurses	5
Pharmacists	5	Pharmacists	1

In 1937, a 235-bed sanitarium was ordered erected in Okayama for the treatment of tuberculosis. There is a medical school in this city with a normal enrolment of 328 students.

Sewage from the Okayama sewerage system is discharged into Asahi-gawa.

#### (11) *Vulnerable points.*

The railroad freight yards.  
Electric Railroad Power Plant.  
Powder storehouse.  
Okayama Gas Company.  
Okayama Electric Power Plant.

### C. Kure (1940 population: 276,085).

#### (1) *Importance.*

Kure (FIGURE VIII-40) is the site of Japan's largest naval base (FIGURE VIII-41). It is also headquarters for a number of important organizations, such as the District Administration, the Navy Yard, a training station, a Station Guard and Defense Squadron, the Naval Supply Depot, an air station, the Hiro Aircraft Factory, a submarine school, the Court Martial Department, and the Tōkuyama Fuel Depot and auxiliary port. An excellent harbor and an active industry contribute to the importance of the city. The largest combined dockyard, shipbuilding yard, and naval industrial plant in Japan is located in Kure. Shells, guns, mounts, electrical apparatus, fittings, armor plate, and everything for the construction of ships is manufactured here. There is a steel plant in Kure operating on the Krupp system and employing 12 furnaces.

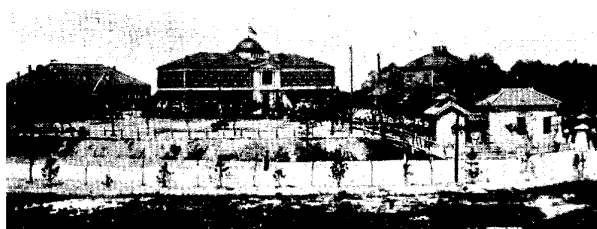


FIGURE VIII-41. Kure.  
Part of Naval Station.

#### (2) *Physical characteristics.*

(a) *Location.* Kure lies about 200 miles west of Ōsaka on the southern coast of Honshū; on the west, it faces Hiroshimawan, an inlet on the northern shore of the Inland Sea. The harbor is protected to the west and south by 2 groups of rugged granite islands. The city is situated on the northeast side of Kure-kō and rests on a triangular-shaped alluvial plain. The land around the bay is high. One hill on the north side rises to a height of 1,312 feet, and another, on the southeast, to 1,640 feet. The station can expand only south along the shore because of the high rocky hills inland and the presence of the town to the north.

(b) *Shape and dimensions.* The city has expanded along the shore northeast and northwest of the naval station and extends inland for a mile or more (FIGURE VIII-40). There is some development along the Niko-gawa.

(c) *Degree of compactness.* The large population, combined with the physical limitations to the expansion of the city, makes it probable that population density is very high. Outlying developments have taken place in recent years, such as the construction of the Hiro Naval Aircraft manufacturing plant about 2½ miles east of Kure on Hiro-wan.

(d) *Differentiated sections.* The principal industrial development of Kure is closely associated with the naval station. Within the town, grind-stones, rubber goods, sake, and soap

are manufactured, as well as many other products. The commercial center extends to the north of the railroad station (FIGURE VIII-40), and is delimited on the north by a residential area.

(c) *Street plan.* Kure is a relatively new city and has a regular, rectangular street plan with streets running roughly northeast-southwest and northwest-southeast.

(f) *Open spaces.* Open spaces are found in the immediate vicinity of the railroad station, and north of the station in the northwestern sector of the town (FIGURE VIII-41). It is possible, however, that the latter area is no longer open.

### (3) Means of access.

(a) *Water.* The roadstead of Kure, exclusive of its 3 entrance approaches, has a diameter of about 3 miles. Two approaches are natural, 1 artificial. The latter is cut through the narrowest part of the peninsula near the town of Seto. This canal, the Ondo-seto, is only 50 meters (about 164 feet) wide and is used by all coastal vessels. Commercial traffic is unable to use the naval base anchorage, and a separate bay northwest of Kure at Yoshiura has been reserved for it. The naval station channel is long and irregular, with numerous fortified islands and points.

(b) *Rail.* A branch railway leaves the main line of the Sanyō at Kaidaichi and runs single-tracked to Kure. This railroad communicates with nearby Hiroshima and follows the curve of the coast to the north and east of Kure.

(c) *Road.* A highway connects with Hiroshima to the north.

(d) *Air.* Three miles east of Kure is the Kure Naval Air Station.

### (4) Billeting facilities.

Barracks in the naval station accommodate large numbers of naval personnel. Other barracks in the harbor area provide billeting space for naval yard workers. The Naval Academy on nearby Eda-jima (island) affords billeting facilities (FIGURE VIII-42).

### (5) Buildings.

The most important structures of this area are of a military nature. The following are of major importance:

- Hiro Aircraft Factory.
- Kure Naval Arsenal.
- Hiro Arsenal (an extension of the Kure Arsenal).
- Hiro Naval Turbine and Engine Factory.
- Torpedo boat depot and mine depot.
- Victualling and clothing depot.
- Naval ordnance stores.
- Kure railroad station (FIGURE VIII-40) includes extensive cranes and oil tanks.

Many of these buildings are of steel frame, sheet metal, and concrete.

### (6) Internal transportation.

Wide, well-surfaced, and comparatively new streets provide good internal street transportation.

### (7) Repair and service facilities.

Kure is superbly equipped for machinery repairs of all types. Large repairs to hulls and machinery can be effected. There are 2 large cranes in the naval base, and a large forge. The arsenal contains a fitting and turning shop, as well as a foundry for the manufacture of large naval guns. There are 3 drydocks. Armor plate repairs are made in the Kure Naval Yard.

### (8) Public utilities.

(a) *Water.* Water is supplied by a modern system to all parts of the city from Ota-gawa. The daily per capita supply is 30 gallons.

(b) *Power.* Electricity is supplied to all parts of Kure.

(c) *Gas.* Gas is supplied from Hiroshima.

(d) *Communications.* Telegraph, telephone, and radio communications are maintained, the latter through the naval radio station.

### (9) Warehouse and storage.

Along the waterfront of the town are warehouses adjoining the piers and wharves (FIGURE VIII-40). Naval oil storage

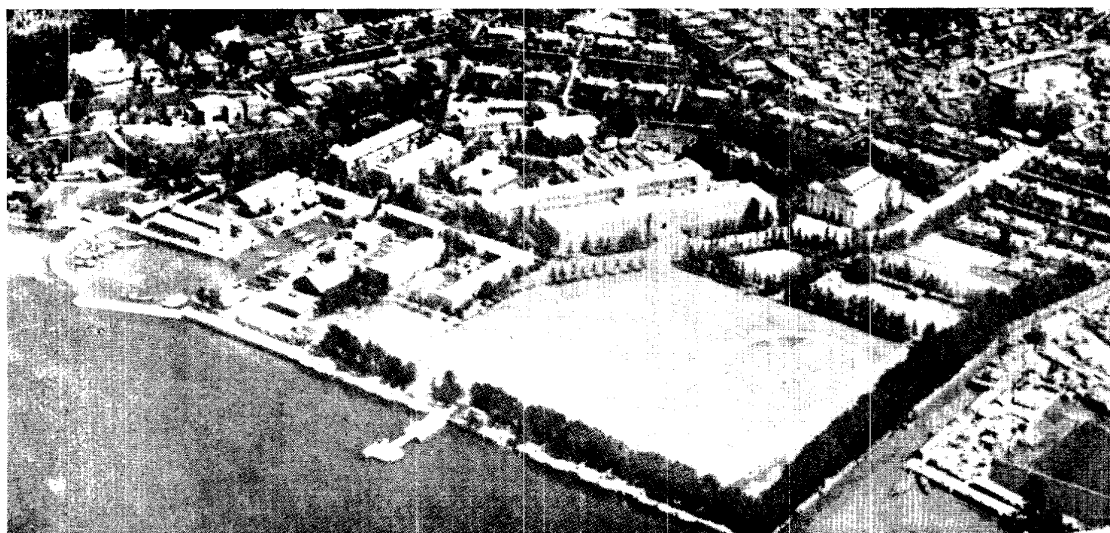


FIGURE VIII-42. Kure.  
Naval Academy on Eda-jima, 1935.

Confidential

## CITIES AND TOWNS

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is reported to be in 16 tanks, with a total capacity of 632,000 tons. Extensive coal bunkering facilities exist.

**(10) Health and sanitation facilities.**

The hospital facilities and medical personnel of Kure in 1938 were as follows:

Hospitals	1
Beds	71
Doctors	4
Nurses	10
Pharmacists	1
Admissions	1,481

**(11) Vulnerable points.**

The Onodo-seto (canal), which provides access to Kure Naval base, is the most vulnerable point in the area. The rail junction at Kaikaidai is a vital link in Kure's supply line by rail. The numerous buildings associated with the naval base and arsenal are key points in the function of the city as a naval base.

**D. Hiroshima (1940 population: 343,968).**

**(1) Importance.**

As an administrative center for western Japan, the city of Hiroshima (FIGURE VIII-43) has a large number of important government offices, among which are the Communications Inspection Office, the Traffic and Track Maintenance Office, the Transportation Section of the Army Department, the Revenue Superintendence Office, and the 5th Army Division Headquarters. An Army Provisions Depot, a Munitions Depot, and the Hiroshima Naval Station are located here. The Hiroshima College of Literature and Physics is an important institution in this city.

In addition to its administrative function, Hiroshima is an important industrial center manufacturing textiles, rubber goods, canned goods, machines, tools, munitions, and other products. Before the war, Hiroshima's foreign and domestic trade totalled 200,000,000 yen annually.

**(2) Physical characteristics.**

**(a) Location.** The city of Hiroshima is located about 200 miles west of Osaka at the head of Hiroshima-wan (bay), an inlet of the Inland Sea. The city lies about 4 miles inland from its port Ujina. Hiroshima rests on a delta split into islands by the 5 mouths (FIGURE VIII-44) of Ota-gawa (river). Along the shores of Hiroshima-wan (bay), south of the city, low marshy land prevails. Except for the coastal plain and the valley of Ota-gawa to the north, Hiroshima is surrounded by mountains on all sides.

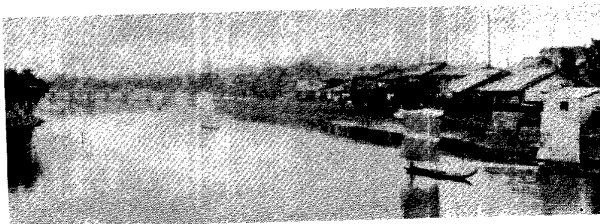


FIGURE VIII - 44. Hiroshima.

Branch of the Ōta-gawa in Hiroshima. Looking SW. 1932.

**(b) Shape and dimensions.** The shape of Hiroshima is irregular, for the city has thrown out tentacles in all directions.

The city tapers in 2 directions: south, toward its port of Ujina and north. It measures about 5 miles in north-south extent, if the port area is taken as part of the city.

**(c) Degree of compactness.** In structure, the city is not particularly compact, having extended its development along roads, rivers, canals, and lowland areas in irregular fashion. Population density, however, is high.

**(d) Differentiated sections.** A number of industries are located in the vicinity of the harbor; the most important are those connected with the navy yard. These industries normally employ 20,000 men. A large aircraft factory was opened in 1939, but its exact location has not been ascertained. Numerous industries are scattered throughout the southern part of the city, often located along distributaries and canals.

**(e) Street plan.** The orientation of the streets of Hiroshima is roughly north-south, east-west. This grid pattern is necessarily much modified by the irregular deltaic islands, upon which much of the city rests.

**(f) Open spaces.** A large military compound located in the northern part of the city (FIGURE VIII-43) provides the most conspicuous open space in Hiroshima. In addition, there are numerous parks, generally surrounding shrines and temples.

**(3) Means of access.**

**(a) Water.** Hiroshima has ready access to the Inland Sea through its port of Ujina.

**(b) Rail.** Hiroshima is 180 miles west of Kobe on the Sanyō. A line running north to Miyoshi gives Hiroshima a connection with the northern part of southern Honshū. The Geibi Railway Company operates a line from Tokaichi to Hiroshima and 2 lines from Ujina, employing both steam trains and gasoline cars.

**(c) Air.** Hiroshima Airfield is a large civilian landing field. Fifteen miles northeast of the city, on Misasa-gawa, is Nakanita Airfield, believed to be the center of paratroop training in Japan.

**(4) Billeting facilities.**

Brick barracks in the harbor provide facilities for more than 3,000 men. This space is augmented by the barracks in the military compound in the northern part of the city.

The city contains little in the way of hotel facilities, though a few small inns can accommodate 20 to 30 men each.

**(5) Buildings.**

Hiroshima contains a large number of administrative buildings, as well as numerous factories. Some of the more important factories are listed below:

Tōkyō Electric Company: instruments, meters, etc.

Suzuki Company: nitrogen, fertilizers.

Japan Engineering Company: oxygen, nitrogen, welding apparatus.

Japan Electric Cell Company: batteries.

Daiichi Industrial Company: chemicals, soap, oils and derivatives.

Many smaller factories are scattered throughout the city; most of them, like nearly all the domestic structures, are made of wood.

**(6) Internal transportation.**

Street cars and busses supply public transportation. Some of the more important streets have been developed for motor traffic.

Internal transportation is furnished by the numerous canals and rivers intersecting the city. Suburban lines give train service within the city.

**(7) Repair and service facilities.**

Repair and service facilities for virtually all types of machinery are available in Hiroshima.

**(8) Public utilities.**

(a) *Water.* The city water supply comes from the Ōta-gawa (river) which rises in the mountains to the north (FIGURE VIII-44). The daily per capita supply is 30 gallons.

(b) *Power.* The Hiroshima Electric Company, which is surpassed in Japan only by the Tōkyō and Toho Electric Companies, has installed 500,000 electric lamps in the city; adequate electricity for industrial and domestic uses is furnished.

(c) *Gas.* The Hiroshima Gas and Electric Railway Company supplies gas not only to the city of Hiroshima, but to Kure, Onomichi, and the surrounding area as well.

(d) *Communications.* Telephone equipment, particularly in the harbor area, is excellent. A telephone cable connects the city with Nino-shima and other islands in Hiroshima-wan.

Telegraph lines connect Hiroshima with the entire Japanese system. Two radio broadcasting stations are reported to be operated by JOFK.

**(9) Warehouses and storage.**

Warehouse facilities are abundant in the port area and distributed throughout the city along canals and rivers.

**(10) Health and sanitation facilities.**

In 1938, hospitals and medical personnel of Hiroshima were as follows:

	HOSPITALS	CONVALESCENT HOMES	CLINICS
Number	1	1	3
Beds	170	60	—
Doctors	4	4	3
Nurses	11	8	5
Pharmacists	2	1	—

**(11) Vulnerable points.**

Bridges connecting the deltaic islands of Hiroshima are particularly vital points in this city.

**E. Matsuyama (1940 population: 117,534).**

**(1) Importance.**

Matsuyama is the capital of Ehime-ken (prefecture), the headquarters of the Ninth Infantry Brigade, and the most important city and port in western Shikoku. It is strategically important because it dominates Iyo-nada (open bay). The manufacture of cotton fabrics is the principal industrial activity.

**(2) Physical characteristics.**

Matsuyama is situated on the northwest coast facing Iyo Straits, about 3 miles east of Mitsuhamu.

Matsuyama lies on a delta plain encircling Katsuyama. A short distance to the north of the city, there are moderately rugged mountains whose foothills, several hundred feet high, lie close to the city limits. About halfway between Matsuyama and Mitsuhamu are other low hills with low passes through which run a railroad and a highway. What appears to be a

diked channel of Ishita-gawa (FIGURE VIII-45) flows through the southeastern quarter.

Matsuyama covers about 4 square miles, is roughly square in shape and moderately compact. It does not appear to be sharply differentiated functionally. The plan of the city follows a definite grid pattern oriented north-south and east-west (FIGURE VIII-46).

Except for a few main thoroughfares, streets are narrow. The main street encircling the castle hill and military headquarters is wide enough for motor traffic (FIGURE VIII-47).

The principal open space is the area comprising the grounds of the military headquarters. The wooded castle park contains few buildings. The largest open spaces are in the outlying areas.

**(3) Means of access.**

(a) *Water.* Matsuyama has access to the sea through the port of Mitsuhamu, about 3 miles to the northwest, and through Nagahama, another port about 25 miles to the southwest.

(b) *Rail.* It is connected with cities of the island by the national railroad system. Short lines, 15 to 20 miles long, run back to small towns in the mountain country.

(c) *Road.* Highway connections are good; primary and secondary roads lead out in many directions.

(d) *Air.* There is a fighter airport just south of Matsuyama and 3¼ miles east of Iyo-nada. There is another airport 2¾ miles west of Matsuyama.

**(4) Billeting facilities.**

The barracks of the infantry regiment are doubtless the best facilities in the city. A large commercial school is located on the northern outskirts.

**(5) Buildings.**

The most conspicuous building is probably the castle in the north-central section. Many of the large buildings are of substantial construction (FIGURE VIII-47).

**(6) Internal transportation.**

An electric railway line connecting this city with Mitsuhamu enters Matsuyama on the northwest and encircles the city on the outskirts, with a branch extending around the castle park. Another spur crosses the river on the southern edge of the city.

The diked river, which cuts diagonally across the southeastern part of the city, probably serves for canal barges. It is crossed by 3 ordinary bridges and 1 railway bridge.

**(7) Public utilities.**

(a) *Water.* A reservoir is probably located 1¾ miles north-east of the city (FIGURE VIII-45).

(b) *Power.* Electric power is available.

(c) *Communications.*

1. **TELEPHONES.** A telephone exchange is located in the south-central portion of the city about a block southeast of the regimental grounds. Matsuyama is connected with the telephone and telegraph network.

2. **RADIO.** A new radio station (JOVG) operates on a frequency of 950 kilocycles.

**(8) Warehouses and storage.**

School buildings, the barracks, and an auditorium could furnish some cover for storage. Open storage is available on the school grounds, troop parade grounds, temple grounds, and in several parks.

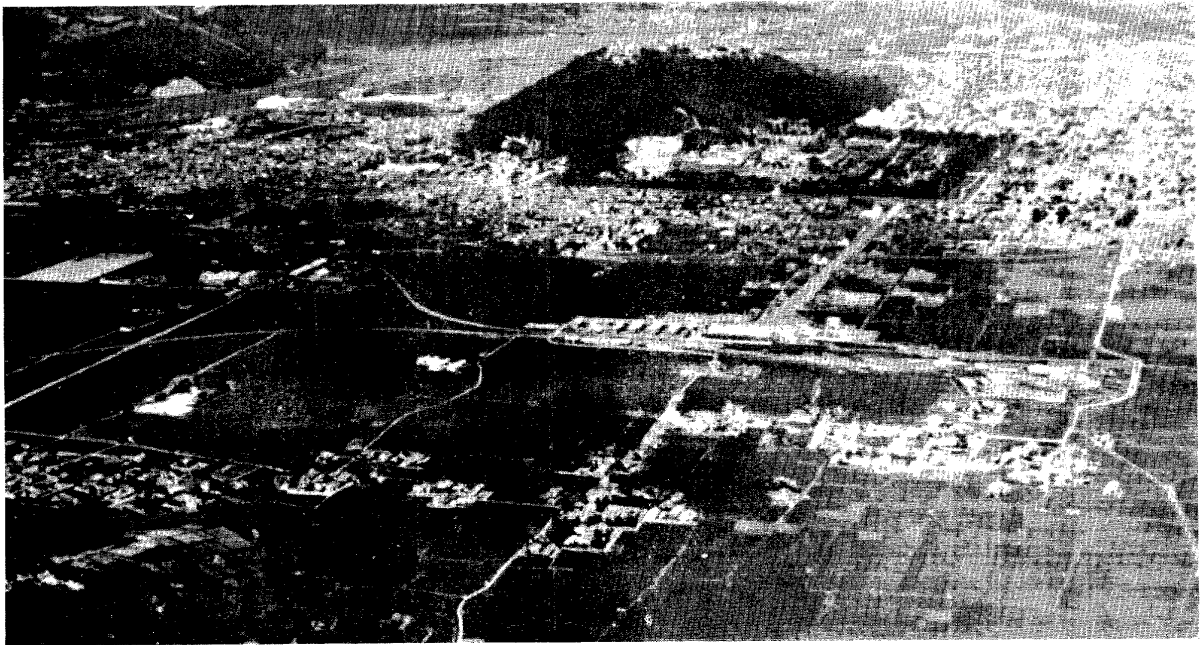


FIGURE VIII - 46. Matsuyama.

View of Matsuyama and plain; Matsuyama Park and castle (center); railroad station (below castle). 1930.



FIGURE VIII - 47. Matsuyama.

View of southern section of city. Looking down from the Storied Gate.

**(9) Health and sanitation facilities.**

One Red Cross hospital is located in the east-central section of the city.

Matsuyama has a sewerage system.

**(10) Vulnerable points.**

The vulnerable points are as follows:

Munitions magazine, in the extreme northeastern outskirts of the city.

Railroad and electric line crossing between Mitsuhamu and Matsuyama.

Reservoir, in the northern foothills section.

Electric distributing station.

Regimental headquarters.

Railway and other bridges.

Port works at Mitsuhamu.

**F. Niihama (1940 population: 42,392).**

**(1) Importance.**

Niihama is strategically important because of the copper and aluminum reduction plants and the Sumitomo Company and related chemical works. It is the outlet for the famous Besshi

copper mines, one of the foremost copper producers of the Empire. The area is strongly fortified.

Fishing is one of the main activities of this city.

**(2) Physical characteristics.**

Niihama is situated on the north coast of Shikoku, about half way between Matsuyama and Takamatsu, and almost directly south of Fukuyama on Honshū. It lies west of a broad promontory at the head of Hiuchi-nada.

The city proper occupies the fringe (1½ miles wide) of the coastal strip, which is largely devoted to rice paddies. In the immediate background are steep mountain slopes (FIGURE VIII-48). A short distance offshore, opposite the city, is the small wooded island of Miyo-shima. A considerable area of made land, probably totalling 1 or 2 square miles, adjoins the town site; various industrial plants have been built on it.

The city extends approximately 1½ miles in a northeast-southwest direction and is not over ½ mile wide. It is strung out along the coastal strip.

Between the waterfront and the city is an open space about 200 yards wide and about 880 yards long.

The waterfront area is occupied by chemical and metallurgical plants while the city proper has shops and dwellings (FIGURE VIII-48).

A long main street parallels the shoreline and another intersecting this extends inland toward the south. There are a few roughly square or rectangular blocks, but the dominant pattern is irregular.

The city itself contains little open space.

**(3) Means of access.**

(a) *Water.* Niihama is accessible by water, and deep-draft ocean vessels can berth at docks on the small island of Miyo-shima about 1 mile offshore. The entrance to the river harbor has recently been dredged to 27 or 28 feet.

(b) *Rail.* This city is connected by a short spur with the main railroad which skirts the north coast of Shikoku.

(c) *Road.* A secondary highway connects with the pri-

mary highway which roughly parallels the coast and the railroad. Other roads lead out to small villages in the hinterland.

(d) *Air.* There is a large civil airfield at Niihama.

**(4) Billeting facilities.**

Warehouses and dormitories could probably be used. As the city is characterized by specialized industries, hotels and inns are doubtless few in number and small in capacity.

**(5) Buildings.**

The most important buildings in this area are associated with the various large metallurgical and chemical industries (FIGURE VIII-48). Most of the buildings in the city are low, 1- or 2-story, tile-roofed structures of flimsy construction.

**(6) Internal transportation.**

A short canal connects the port and the inland sections of the city, and probably serves for ore barges and small boats.

**(7) Repair and service facilities.**

The city has repair and service facilities associated with the industrial plants, particularly the Sumitomo machinery works.

**(8) Public utilities.**

(a) *Water.* Water is available from nearby small mountain streams, which have enough water to operate hydroelectric installations.

(b) *Power.* Niihama has 3 steam power plants of the Shikoku Chuo Denryoku.

(c) *Ice and gas.* Artificial ice and gas are doubtless produced for industrial use.

(d) *Communications.* Telephone and telegraph connections are maintained with the rest of Japan.

**(9) Warehouses and storage.**

Both covered and open storage space is available at the industrial plants.



FIGURE VIII-48. Niihama.

General view of Sumitomo Chemical Works and site of city. Looking S. Sumitomo Chemical Works (foreground); city (left middle ground); mountain behind the city.

**(10) Health and sanitation facilities.**

Plague and typhus are both reported prevalent in the surrounding territory.

**(11) Vulnerable points.**

The most conspicuous and the most important target is the Sumitomo Aluminum Reduction plant, which stands out prominently in the port section. The steam power plants near the town and the Hadeba hydroelectric plant in the hills to the south are vulnerable.

**G. Takamatsu (1940 population: 111,207).****(1) Importance.**

Takamatsu is one of the ports of call on the Inland Sea. Its strategic importance is derived from its commanding position with reference to Bisan-seto (straits). It is the capital of Kagawa Prefecture and also has some industrial significance because of its textile and match factories.

**(2) Physical characteristics.**

Takamatsu is situated on the extreme northeastern part of the island of Shikoku on Bisan-seto, southeast of Okayama on Honshū.

The city is located on a flat coastal plain and delta between Iwasio-yama (mountain) (761-foot elevation) and Yashima (961-foot elevation) and just east of Koto-gawa.

The city is roughly triangular in shape with the base of the triangle on the waterfront and the apex to the south and close to a spur from Iwasio-yama. The city covers approximately 2¼ square miles of territory and does not seem to be sharply differentiated functionally.

The narrow streets, running north-south and east-west, intersect at right angles, but the squares are of variable size.

The chief open spaces are the Ritsurin park of 138 acres; the diked salt pan flats all along the waterfront east and west of the town; and in the eastern part adjacent to the railroad and electric railway lines.

**(3) Means of access.**

(a) *Water.* This port is easily accessible from the sea via Bisan-seto as the harbor, protected by a breakwater, is dredged to 20 feet (1929). Boats of 3,000 tons can be accommodated.

(b) *Rail.* Single-track (3' 6" gauge) railroads connect Takamatsu with Matsuyama to the west, Kōchi to the south, and Tokushima on the east. A branch line, 1½ miles in length, connects this city with a copper mine at Shionoe in the mountains to the south.

(c) *Road.* A primary road connects Takamatsu with Matsuyama on the west, Kōchi on the south, and Tokushima on the east. Secondary roads follow the coast and also connect with the inland villages.

(d) *Air.* There is a seaplane station at the mouth of Koto-gawa. There is a military landing field and a landing field for the Nippon Koku Kenkyōjo airline.

**(4) Billeting facilities.**

A middle school and a high school afford billeting space; additional billets are probably available in other schools.

One hotel of 15 rooms, the Taimano Hotel, and 2 inns are located here.

**(5) Buildings.**

Several large chimneys in the outlying areas and near the waterfront indicate factories. Other buildings are the railroad station and warehouses on the waterfront (FIGURE VIII-49). In the north-central section of the city is a group of buildings including the post office and prefectural and municipal offices.



FIGURE VIII - 49. Takamatsu.

General view of waterfront, showing types of buildings and fishing boats. 1929.

**(6) Internal transportation.**

An electric railway starts at the pier and runs in a southerly direction, skirting the outlying districts, back to the waterfront area, and then eastward as far as the village of Shido.

In the eastern section are several short canals.

**(7) Public utilities.**

(a) *Water.* Takamatsu gets its water from Koto-gawa and 3 bored wells. The water is filtered and stored in 2 reservoirs, with a combined capacity of 74,132 cubic feet. The system serves 34,000 people.

(b) *Power.* This city is connected with the Shikoku power grid.

(c) *Gas.* A gas tank is located at the eastward end of the city near the bridge over the Somaba-gawa.

(d) *Communications.* Takamatsu has telephone and telegraph communications with the rest of Japan. A submarine cable from the point of land just northeast of Takamatsu runs to Tonosho on Shodo-shima, a small island to the northeast.

**(8) Warehouses and storage.**

There are school buildings; miscellaneous warehouses along the docks and some industrial buildings provide limited storage facilities.

**(9) Health and sanitation facilities.**

Bubonic plague is reported to occur in Takamatsu. Health conditions are probably generally bad.

**(10) Vulnerable points.**

The railroad and its installations would seem to be the most vulnerable targets.

## 84. Sanindō

**A. Introduction.**

Sanindo, as the northern side of southwestern Honshu is called, is a comparatively unproductive and isolated area, far less developed than most other portions of southern Japan. It has little agricultural land because of the rugged terrain; and its location on the Japan Sea, rather than on the commercially more important Inland Sea, is disadvantageous for trade and



industry. The few cities and towns are relatively small; the largest, Matsue, has 56,000 inhabitants. The eastern part of the area, around Wakasa-wan, has several good harbors: Maizuru and Higashi-Maizuru have grown up to serve an important naval base on one inlet, and the commercial port of Tsuruga on another. Two cities in central Sanindō, Matsue and Tottori, are locally important as prefectural capitals, and Yonago, near Matsue, has several small industries. Most of the other towns are small ports serving as trade centers for limited hinterlands. The economic life of the area is for the most part confined to subsistence agriculture and handicrafts, supplemented by fishing and forestry. Railroads and roads are best developed along the coast; the chief external connections are with Shimonoseki to the west and with Ōsaka and Kyōto across the peninsula. The area is served by the Chugoku power grid system and the national telegraph and telephone networks.

**B. Maizuru and Higashi-Maizuru (1940 populations: 29,903 and 49,810).**

The headquarters of the Maizuru Naval District and the only large naval installations on the Honshū coast of the Japan

Sea are concentrated in the Maizuru area. A large navy yard is located 5 miles northeast of Maizuru in Higashi-Maizuru, a town formed in 1938 from suburbs of the older city. There is a naval air station 9 miles northwest of Maizuru, near Kunda. The naval station has extensive shipbuilding and repair facilities, large depots for fuel and other supplies, several munitions factories, permanent barracks for more than 3,000 naval personnel, water and power plants, a radio station, and a hospital.

Maizuru itself is primarily a commercial port, carrying on a trade in rice, grains, and timber with Korea, Hokkaido, and Karafuto; it is located at the head of the southern arm of Maizuru-wan, an inlet of Wakasa-wan. The port facilities accommodate vessels of 10,000 tons. There are rail and road connections with Ōsaka and Kyōto and with other cities on the Japan Sea coast. An airfield is located southeast of the naval station. A heavy artillery battalion maintained its peacetime quarters at Maizuru.

**C. Tsuruga (1940 population: 31,346).**

Tsuruga, the chief commercial port on the Japan Sea coast of Honshū, is on the passenger route from Tōkyō to Vladivostok and on the Trans-Siberian Railroad. It is a brigade and regimental headquarters.

Tsuruga is located at the head of Tsuruga-wan, an inlet of Wakasa-wan; it is 12 miles north of the northern end of Biwa-ko and 50 miles east of Maizuru. Its port will accommodate 10,000-ton vessels (Figures VIII-50 and VIII-51). It is on the coastal railroad and has a connection with Kyōto by way of the east side of Biwa-ko. There is an emergency landing ground 3 miles south-southwest of the city.

Billeting facilities are available in the brigade and regimental barracks areas and in a commercial school; other buildings include the Russian consulate, a mining institute, and a fertilizer factory. Warehouses line the eastern part of the harbor.

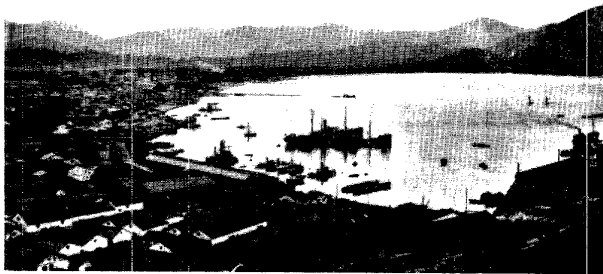


FIGURE VIII-50. Tsuruga.

General view of port, showing concentration of warehouses at eastern end of harbor. Looking W. About 1931.

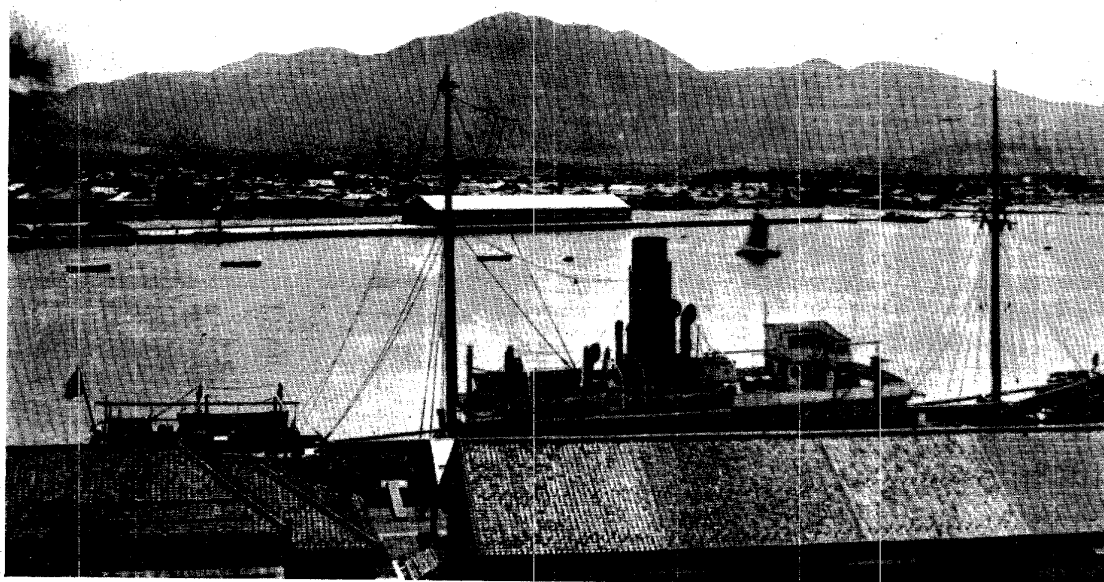


FIGURE VIII-51. Tsuruga.

Portion of city from northeast wharf. Looking SW.



**D. Tottori (1940 population: 49,261).**

Tottori is the capital and chief commercial center of Tottori prefecture, and a regimental headquarters. It is 3 miles inland on a small plain at the mouth of Sendai-kawa, and 60 miles west of Maizuru. It is on the Sanin railroad, and has a branch to Tsuyama and Okayama. A coastal highway and branches lead to Okayama and Himeji. There is an emergency landing ground 1¼ miles to the southeast.

Billeting space is available in the regimental barracks area. Other buildings include the prefectural and municipal offices, the castle, a post office, and schools. Water is obtained from a reservoir on Fukuro-kawa.

**E. Matsue (1940 population: 55,506).**

Matsue is the capital and commercial center of Shimane prefecture and the headquarters of an infantry regiment. It is at the eastern end of Shinji-ko, and divided by a stream which drains the lake. There are many canals, 80 miles north-northeast of Hiroshima.

Matsue is on the Sanin railroad and on an electric line to Taisha, 23 miles to the west. A main highway, paralleling the Sanin railroad, passes through Matsue. Secondary roads lead to nearby communities. There is an army fighter airfield 3¾ miles east-northeast, and a seaplane alighting area in Shinji-ko.

Billeting space is available in the regimental barracks area. Other buildings include the prefectural and municipal offices, a court house, a teachers' college, industrial, commercial, and other schools, and a silk factory.

Water is obtained from a reservoir on the southern limits of the town.

There is a hospital in Matsue.

## 85. Shimonoseki-kaikyo (strait)

### Industrial Area

**A. Introduction.**

This area includes the mountainous westernmost tip of Honshū and a somewhat larger part of the adjacent hill country of northern Kyūshū. There are only 2 small plains, one skirting Fukuoka-wan (bay), and the other lying along the southeastern shores of Suo-nada (open bay). In the interior of the Kyūshū sector lies the so-called "basin" of Chikuho; under its hill-and-dale surface lies the most important coal field of Japan.

The narrow strait (FIGURE VIII-110) forms a bottleneck for both land and sea transportation. It forms part of the shortest route from the great cities of southern Honshū to the Asiatic continent and its southeastern archipelago. Across it, by ferries and a tunnel, flows a large volume of land traffic between Shimonoseki on Honshū and Moji on Kyūshū. The outer approaches to the strait are guarded by strong defenses.

The area contains the major concentration of iron and steel industries in Japan. Yawata is the site of a government-owned iron and steel plant, which is one of the greatest centers of heavy industry outside Western Europe or the United States. Nearby, Kokura, Tobata, and Wakamatsu have shared in this development of heavy industry. This includes, besides iron and steel, the production of nonferrous metals, cement, chemicals, glass, and a great variety of munitions and ordnance. The largest city, Fukuoka, lies at the southwestern extremity of the area.

It is a diversified regional capital for most of the Kyūshū sector and is less specialized in heavy industry than the other cities.

There are 5 major concentrations of population: 1, near Ube on the shores of the Inland Sea east of Shimonoseki; 2, the shores of the strait from Shimonoseki to Yawata; 3, the Fukuoka plain; 4, the Nakatsu plain on Suo-nada; and 5, the Chikuho coal field. Only the last lies inland. Izuka and Nōgata and scores of other towns and villages in the Chikuho basin are typical coal-mining centers. Even in the coal fields there is little manufacturing industry of importance away from tidewater, and the mines are sufficiently scattered to allow the landscape to retain a distinctly agricultural appearance. Most of the area in Kyūshū is cultivated, wheat occupying the higher ground and rice the lowlands. In the rougher Honshū sector, cultivation is more narrowly restricted to the coastal lowlands.

**B. Shimonoseki (1940 population: 196,022).****(1) Importance.**

Shimonoseki is the second city in population in the principal region of heavy industry of Japan. With Moji, it controls the western entrance of the Inland Sea. It is the southern terminus of the Sanyō line, and all rail traffic between Honshū and Kyūshū is now funneled through Shimonoseki and Moji by way of ferries and the Kammon Tunnel.

Manufactured products of Shimonoseki include cement, lime, and fertilizer. It is an important center for domestic commerce, and has served as an embarkation point for troops and supplies for Korea, Manchuria, and North China.

**(2) Physical characteristics.**

(a) *Location.* The city occupies a narrow strip of land between the sea and the relatively low but steep hills, with only a few wedges of development extending short distances up narrow valleys.

(b) *Shape and dimensions.* Shimonoseki extends for about 4 miles along the coast, but seldom as much as a mile inland (FIGURE VIII-52).

(c) *Degree of compactness.* Because of the limitations of its site, Shimonoseki is one of the most compact cities of the industrial area.

(d) *Functional differentiation.* The principal business district of the city lies along the northern extension of the electric railway.

(e) *Street plan.* There is only one principal street. This street parallels the shore line for approximately 2 miles (FIGURE VIII-53).

(f) *Chief open spaces.* These include a military drill ground and 2 parks; one is a few blocks north of the main railroad station, and the other on the eastern extremity of the city (FIGURE VIII-110).

**(3) Means of access.**

(a) *Water.* Although adequate depths are found over a large part of the roadstead, the coasts are very shallow except for channels which have been dredged to a depth of 24 feet. Large ships must anchor in the roadstead where they are served by tugs, or by lighters, of which there are hundreds. A concrete pier accommodates three 4,000-5,000 ton vessels. Ferries run at 15-minute intervals to Moji, 1½ miles across



FIGURE VIII - 52. *Shimonoseki*.  
Waterfront. Looking S. 1935.

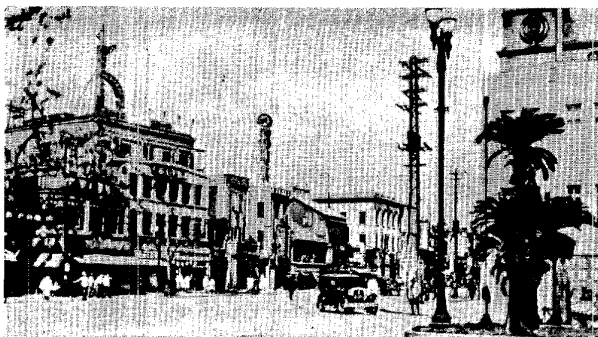


FIGURE VIII - 53. *Shimonoseki*.  
One of the principal streets, the Sanyō-hama.



FIGURE VIII - 54. *Shimonoseki*.  
Main railroad station. Looking S.

the strait. There is also 8-hour service to Fusan, Korea, 150 miles away.

(b) *Rail*. Shimonoseki is the southern terminus for the railways of Honshū. Of these, the line running from Tōkyō and Yokohama to Shimonoseki, via Nagoya, Ōsaka, and Kobe, is the most important strategically. Railyards of this line are located approximately  $1\frac{1}{2}$  miles above the straits and  $\frac{1}{4}$  mile from the west coast. Slips of the railway ferry lie on the western shore near the neck of the isthmus connecting Shimonoseki and Hiko-shima.

(c) *Roads*. Shimonoseki is connected with both the east and west coastal highways by a first-class road from Ogōri, to the northeast, and by a secondary road from Takatsu, to the north.

(d) *Air*. An army airfield, equipped with buildings and hangars, has been built just east of Shimonoseki.

#### (4) *Billeting facilities.*

Billeting facilities are provided south of the drill ground (FIGURE VIII-110) in the Shimonoseki Fortification Command, including officers' quarters and barracks of the Heavy Artillery Regiment and of the old Sixth Regiment. There are numerous schools scattered throughout the city and at least 2 hotels, including the Hotel San-yo, which is adjacent to the main railroad station (FIGURE VIII-54).

#### (5) *Buildings.*

The principal buildings of Shimonoseki are:

District court.	Electric light works.
Town hall.	Ōsaka Steamship Company office.

Two post offices.	Japan Tube Company office.
Two police stations.	Telephone exchange.
Gas company.	Meteorological station.
Electric plant.	

#### (6) *Internal transportation.*

(a) *Tramways*. Shimonoseki has 2 electric railway lines along the shore, one running north and the other east.

(b) *Canal*. A canal parallels the northern electric railway extension.

#### (7) *Repair and service facilities.*

The Hatabu Railroad shops are located in the extreme northwestern part of the city, almost 2 miles from the strait and approximately  $\frac{1}{3}$  mile from the west coast.

#### (8) *Public utilities.*

(a) *Water*. Shimonoseki has 2 reservoirs, one approximately 1,000 feet east of the northbound railway line and approximately 1,500 feet from the Inland Sea, and the other in the hills north of the drill ground. These supply 87,299 people. There are also many street outlets. This system is supplemented by 3,870 wells.

(b) *Power*. The Shimonoseki Maeda Steam Electric Power Plant is located on the eastern shore outside the city limits (FIGURE VIII-55).

(c) *Gas*. There is a gas plant in the city.

(d) *Communications*. A telegraph cable leaving Yoshimi on the west coast, approximately 7 miles north of the straits, connects Shimonoseki with Fusan.

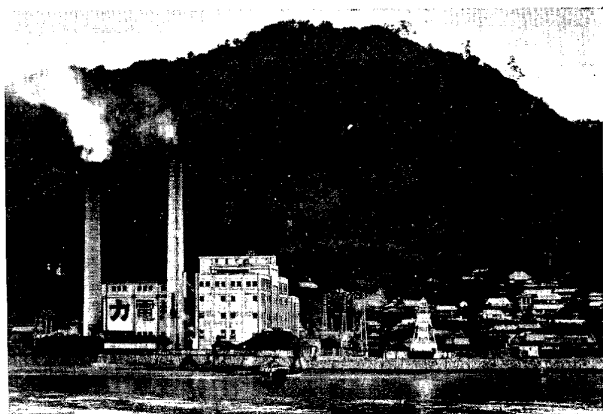


FIGURE VIII - 55. Shimonoseki.

Shimonoseki Maeda Steam Power plant E of the city limits. Looking S.

**(9) Health and sanitation facilities.**

(a) *Hospitals and personnel.* Shimonoseki has 3 hospitals with a total number of 110 beds and a combined staff of 5 doctors and 7 nurses. There is also 1 clinic, employing 1 doctor and 7 nurses.

(b) *Sewage disposal.* The city has a newly developed sewerage system.

**C. Hiko-shima (island).**

Hiko-shima, strategically located west of Moji and Shimonoseki harbors, has shipyards for small craft and is used as a storage and repair center for these 2 cities.

It is an irregularly shaped island approximately 3.3 miles long and 1.5 miles wide. Most of the important industrial development lies on the eastern coast.

A patrol-vessel jetty and drydocks are located at Eno-ura, a small coastal industrial town in northern Hiko-shima. The small island of Ganryu, east of Eno-ura, serves as a natural breakwater for this port. The Kammon tunnel from Moji ends at Eno-ura. A rail yard and roundhouse have been built on the isthmus adjacent to the viaduct leading to Shimonoseki.

On the neck of the northwestern peninsula of Hiko-shima is a smelting works, housed in a 3-story concrete building. The

Nihon Fertilizer Company is located on the northern shore of the southern inlet of Hiko-shima. There is an ice plant in Eno-ura.

The Hiko shipyards and engine works at Eno-ura have full equipment for repairing ships as large as 600 tons, as well as fishing and patrol vessels. There is a repair shop on the isthmus connecting Hiko-shima and Shimonoseki.

There are storage facilities for gas, oil, and coal. The tanks of the Asahi Sekiyu Oil Refinery, with a capacity of 176,000 barrels, and the Rising Sun Petroleum Company are located on the eastern coast of the island. There are 8 storage tanks of unknown capacity at the Tanokubi oil storage center. Large volumes of coal are stored in this area.

The concrete railroad viaduct leading from the tunnel to Shimonoseki is a vulnerable point (FIGURE VIII-110).

**D. Moji (1940 population: 138,997).**

**(1) Importance.**

The port of Moji lies on the extreme northern tip of Kyūshū, at the western entrance of the Inland Sea. Moji ranks fifth among Japanese ports in the number and tonnage of foreign vessels handled, and is second only to Wakamatsu as a coal shipping center. The city is the northern terminus of the Kyūshū railroad network, now connected with Honshū by the Kammon Tunnel. It is the base for lighter service from the roadstead and port to the industrial cities to the southwest.

**(2) Physical characteristics.**

(a) *Location.* The city is situated on a narrow coastal plain, confined by hills to the east (FIGURE VIII-56).

(b) *Shape and dimensions.* Moji follows the coast line, absorbing the town of Dairi to the south, but measures only 500 to 1,000 meters (about  $\frac{3}{8}$  mile) in width. The city is roughly crescent-shaped, modified by a few spurs of built-up area pushing east and south between the hills (FIGURE VIII-57).

(c) *Degree of compactness.* Moji proper is highly compact.

(d) *Differentiated sections.* The principal industrial section of Moji is concentrated in the western quarter of the city (FIGURE VIII-58).

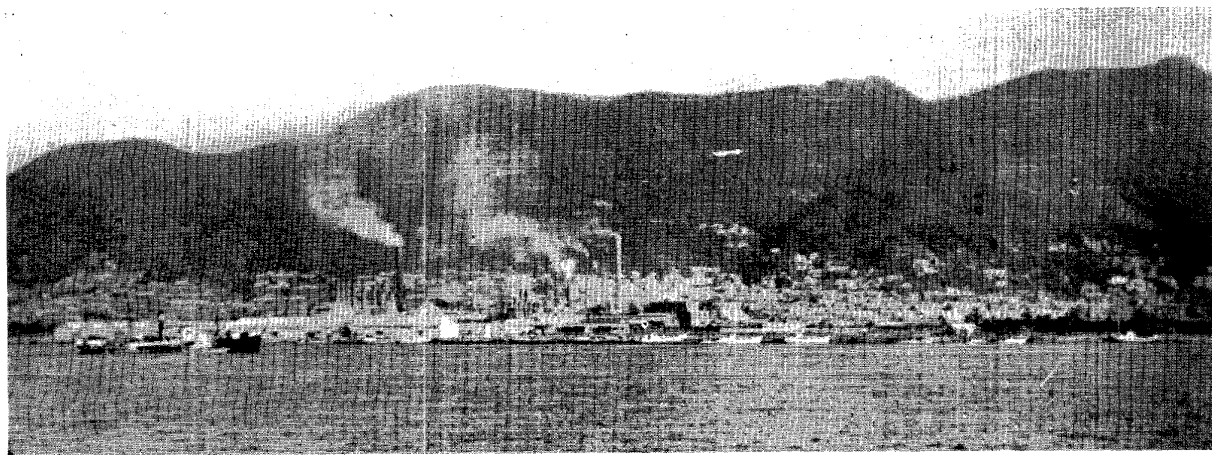


FIGURE VIII - 56. Moji.

Southern water front. Looking W. 1935.



FIGURE VIII - 57. Moji.  
City and harbor. Looking NW.



FIGURE VIII - 59. Moji.  
Main railway station. Looking N.



FIGURE VIII - 58. Moji.  
The Sanbashi business street.

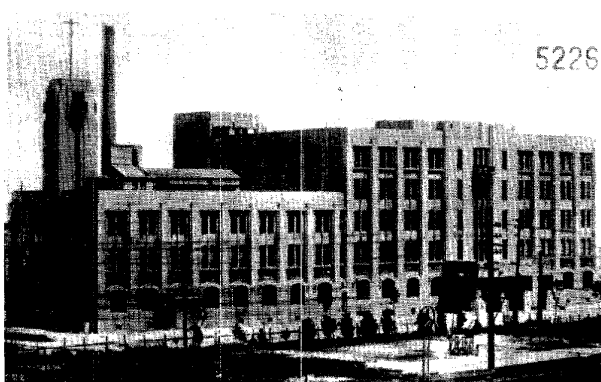


FIGURE VIII - 60. Moji.  
Customs office.

(c) *Street plan.* The pattern of the streets is modified by the physical limitations of the coastal plain.

(f) *Open spaces.* There are 4 parks within the city.

### (3) Means of access.

(a) *Water.* The area between Moji, Shimonoseki, and eastern Hiko-shima forms a natural roadstead. The surrounding hills, though under 400 feet in elevation, provide excellent protection from the wind. The channels from the roadstead to the docks are kept open by continuous dredging. Vessels of 30-foot draft and up to 25,000 tons can be accommodated at the long quay. Larger boats must remain in the roadstead where loading and discharging are carried on by lighters. General freight docks are located near the center of the waterfront installations. Government coal docks lie immediately to the south.

(b) *Rail.* Moji is the northern terminus for the rail lines of Kyūshū. Trains from Shimonoseki reach Moji in 10 minutes, through the Kammon Tunnel which is about 3½ miles long. Railway ferry slips lie between Dai-ri and Komorie. There are railyards at both Dai-ri and Komorie, the latter equipped with repair shops and roundhouse (FIGURE VIII-59).

(c) *Roads.* Good highways lead south and west to Kurume, and Fukuoka, as well as southeast to Ōita. The latter road is a recently completed military highway.

(d) *Air.* There are 2 military landing fields, one of which lies 1¼ miles southwest of Moji, and the other ¾ mile north-east of the city, on the northeastern tip of the island.

### (4) Billeting facilities.

There are at least 11 schools which would provide limited billeting space.

### (5) Buildings.

Moji's most important public and commercial buildings are of brick and reinforced concrete construction. The following buildings are of major importance:

Two post offices.	Mitsui Trading Company office.
Three customs offices (FIGURE VIII-60).	Gas works.
Town hall.	Steel works.
Signal station.	Cement works.
Telephone building.	Alcohol factory.
Telegraph building.	Metal works.
Osaka Steamship Company office.	Rice mills.
Nippon Steamship Company office.	Flour mills.
	Sugar factory.

### (6) Internal transportation.

(a) *Rail.* An electric railway line serves the main commercial street, the Nishi-hon-machi, and branches eastward to the coast.

(b) *Canal.* There are several canals within the city which permit barges and probably lighters to serve industries back of the waterfront.

### (7) Repair and storage facilities.

An arms repair factory is located at the Army Munitions Arsenal on the shore north of the city (FIGURE VIII-110).

**(8) Public utilities.**

(a) *Water.* The municipal water system, the source of which is the Kuro-kawa, serves 15,512 houses. It includes 2 clear water reservoirs and a large number of street outlets. The system is supplemented by 3,800 wells.

(b) *Power.* Electric power is supplied from the northern sector of the East Kyūshū grid.

(c) *Gas.* There is a gas plant in the city.

(d) *Communications.* Moji has telephone and telegraph connections with all Japan. Cables carry the interisland lines across the strait to Hiko-shima. There is a radio mast east of the central wharf.

**(9) Warehouses and storage.**

In the suburb of Dai-ri, the Standard-Vacuum Oil Company has 4 storage tanks for gasoline and kerosene, with a total capacity of 13,600 tons. Other fuel-oil storage facilities, owned by Japanese firms, consist of one 1,000-ton and one 3,000-ton tank.

The Mitsui warehouses and many others are distributed along the waterfront. There is a grain warehouse at the end of the rail line on the eastern shore, northeast of Moji.

**(10) Health and sanitation facilities.**

There are 2 hospitals, one of which has 124 beds.

**E. Ube (1940 population: 100,680).****(1) Importance.**

Ube, a coal-mining and industrial city, contains the largest magnesium plant and the third largest nitrogen-fixation plant in Japan proper. The former accounts for approximately 35% of the total magnesium production capacity of the Japanese Empire and 65% of that of Japan proper. The 2 steam-power plants are the largest in western Honshū. The key resource is coal, which comes from large submarine coal mines. Cement, explosives, chemicals, and synthetic oil are produced.

**(2) Physical characteristics.**

Ube lies about 25 miles east of Shimonoseki on the north shore of the Inland Sea. The principal business district and most of the industrial plants are clustered around the waterfront, much of which is reclaimed land. Miners' residences are located near the coal mines.

**(3) Means of access.**

The artificial harbor has depths of 13 to 18 feet and is protected by breakwaters to the east, west, and south.

The Sanyō main line by-passes Ube to the north, but serves the city by a coastal branch line (FIGURE VIII-110). An electric line from Onoda extends to the harbor on the western side of the city.

A prefectural highway from Funaki to Ogōri passes through Ube.

There is a seaplane base 2 miles northwest of Ube, and an emergency landing field approximately 3½ miles northeast of the city.

**(4) Billeting facilities.**

At least 10 schools provide limited billeting facilities.

**(5) Buildings.**

The following industrial buildings are located on a small

peninsula of reclaimed land on the west side of the harbor:

Riken Metal Company magnesium plant, equipped with large electrolytic sheds, rectifiers, and boiler house with 3 or 4 100-foot steel chimneys.

Ube Nitrogen Fertilizer Company, served by its own 13,000-kilowatt steam power plant.

Ube Cement Company, including mills, 15 silos, and a 13,400-kilowatt steam power plant.

Ube Coal Liquefaction Company, one of Japan's largest synthetic oil plants.

Titanium Industry Company.

Other buildings are:

Nippon Motor Oil Company on the shore southeast of the Mashime-gawa.

Ube Soda Company, just northeast of the east breakwater, including a 12,000-kilowatt power plant.

Ube Spinning and Weaving Company on the east bank of the Mashime-gawa, a few blocks south of the electric railroad line.

City hall, 8 blocks inland, east of Mashime-gawa.

**(6) Internal transportation.**

The Ube electric railroad runs north of the industrial portion of the city.

The Koto-gawa, west of the harbor, and the Mashime-gawa, which flows into the harbor, facilitate transportation within the city.

**(7) Public utilities.**

The Kōtō-gawa is the source of the water system. A reservoir supplies 70,000 people daily. There are 138 street outlets.

Contributing power to the western Honshū grid are 2 power plants. The Ube Number 2 Steam Plant, having a capacity of 75,000 kilowatts, is the largest in western Honshū. It is located on the western side of the harbor. The old Ube Number 1 Plant, which has a capacity of 12,000 kilowatts, is now used as a standby for the Number 2 Plant. It lies on the northwest bank of the Mashime-gawa, a few blocks south of the main line of the Ube electric railway.

**(8) Warehouses and storage.**

The Ube Cement Company is equipped with large storehouses. Covered coal storage lies along the north side of the Ube Number 2 Steam Power Plant.

**(9) Health and sanitation facilities.**

Two hospitals are located between the harbor and Mashime-gawa.

**(10) Vulnerable points.**

Riken Metal Company.

Ube Number 2 Steam Power Plant.

Ube Coal Liquefaction Company.

Ube Cement Company.

Ube Nitrogen Fertilizer Company.

**F. Yawata (1940 population: 261,309).****(1) Importance.**

Yawata is the site of the great Imperial Iron and Steel Works, by far the largest producer of pig iron and steel in the Japanese Empire. The city was virtually born with the establishment of the first units of the steel plant half a century ago,

and the town has developed as a residential and servicing center for the personnel of the mill. Though steel industries have been established in the 3 nearby cities, the main plant remains far more important than all of the others combined. The Kurosaki industrial area, on the western outskirts of Yawata, has developed from a suburban village to an urban and industrial adjunct. It too has important heavy industries, including one of the plants of the Japan Aluminum Company.

## (2) Physical characteristics.

(a) *Location.* Yawata, in northern Kyūshū, lies near the eastern end of the southern shore of Dō-kai (also called Yawata-gawa (river) and Kukino-umi (sea) (FIGURES VIII-61 and VIII-111, inset). Prior to the extensive program of reclamation by dredging and filling, which has reduced the water area of the bay by one-half, Yawata was confined to a narrow strip of land, about ½ mile broad, along the southern and eastern shores of the bay between the hills and the water, and an area of flat land extending up the Yawata valley from the southeastern corner of the bay. The made land in the bay has more than doubled the area of the city.

(b) *Shape and dimensions.* The general shape of the Yawata-Kurosaki area is that of a right triangle with a short north-south eastern side, a longer east-west southern side, and a hypotenuse along the front of the reclaimed area, which is marked by the central channel of the bay. The eastern side is about 2, and the southern side about 3½ miles in length (FIGURE VIII-111).

(c) *Degree of compactness and chief open spaces.* On the low ground residential and industrial structures are crowded closely together; one of the few open spaces of any kind below the slopes of the hills is the baseball field (FIGURE VIII-62). The reclaimed land is interspersed with basins and channels.

(d) *Differentiated functions.* Yawata is sharply divided into 2 sections. The industrial area, devoid of living quarters, lies north and west of the railroad and includes all the reclaimed land on the Yawata side of the bay. The residential area is crowded between the railroad line and the mountains and up the Yawata valley. In it are buildings auxiliary to the plant, such as the administration building (FIGURE VIII-63) and the large hospital.

## (3) Means of access.

(a) *Water.* By sea, access is through Hon-kō (harbor), the mouth of Dōkai, between Tobata and Wakamatsu, and then by way of narrow dredged channels, with many forks and branches, to the docks and quays on the margins of the reclaimed land (FIGURE VIII-64). Although small ocean-going vessels can dock, the wharves are served principally by lighters and barges, which are loaded not only from ships anchored in the main channel of Dō-kai, but in the ports of Tobata, Wakamatsu, and even Moji.

(b) *Rail.* A double-track section of the main Kyūshū line, which extends from Moji to Tosu, passes through Yawata, providing easy access from Honshu via Moji, from the southeast via Kokura, and from the south and west via Fukuoka and Tosu (FIGURE VIII-111). Nevertheless, the rail facilities are inadequate and handle only a small fraction of the traffic moved by water. In the industrial area, however, extensive yards branch off from the main line. There are 2 stations within Yawata proper, one east and one south of the bay. Kurosaki station lies west of the city.

An electric tramway runs east from Yawata, south of the knob of Kompira-yama, and thence northeast to Kokura, thus helping to relieve congestion on the railroad and highway through Tobata.

(c) *Road.* There is a closely knit network of roads through the area south of the Strait, with arteries leading northeast to Moji, southeast to Ōita, south to the Chikugo coal field, and southwest to Fukuoka and Kurume.

(d) *Air.* Access by air is to be had only through the landing fields in the vicinity of Kokura and a field to the west on the coast just north of the mouth of Onga-gawa.

## (4) Billeting facilities.

A few schools offer the only obviously suitable billeting facilities.

## (5) Buildings.

The industrial buildings are of a variety of ages and types, from some of the oldest shops built in the last century to very recent large ferro-concrete structures. In the variety of enterprises connected with iron smelting and steel finishing, and in its high degree of integration, the plant is said to resemble the Ford River Rouge establishment, although the forest of high chimneys with their constant billows of dirty smoke more obviously suggests England's Black Country plans (FIGURE VIII-65). The residences are of the usual wooden tiled-roof construction, crowded in a density which suggests a highly favorable incendiary target.

## (6) Internal transportation.

There are street-car lines through the city and leading to Tobata, which adjoins Yawata to the northeast. A large share of the transportation of workmen to and from the various parts of the plant could be handled by bus, by rail through the extensive yards of the plant, and by boat along the water front.

## (7) Repair and service facilities.

There are shops throughout the plant area which could handle general repairs.

## (8) Public utilities.

(a) *Water.* The water supply for Yawata and possibly for Tobata comes from a dam on Onga-gawa, 4 miles south of the city. There is also a reservoir in the city area (FIGURE VIII-111).

(b) *Power.* Four large steam plants of the Imperial Steel works are located in the city. These are all connected with the northern sector of the East Kyūshū network.

## (9) Health and sanitation facilities.

The steel plant has a large hospital in the center of the city.

## (10) Vulnerable points.

The iron and steel plant, the narrow dredged channels of the harbor, and the main rail lines are the principal vulnerable areas.

## (11) War damage.

Considerable damage to the iron and steel plant area is reported from recent 20th Air Force raids.

## G. Tobata (1940 population: 84,260).

Tobata, a small fishing village when the iron and steel in-



FIGURE VIII - 61. *Yawata*.  
Airview over city, steel plant, and eastern end of Dō-kai. Looking N. 1916.



FIGURE VIII - 62. *Yawata*.  
Airview over central residential area of the city, with the steel plant in the background; large open space is a baseball diamond. Looking N.

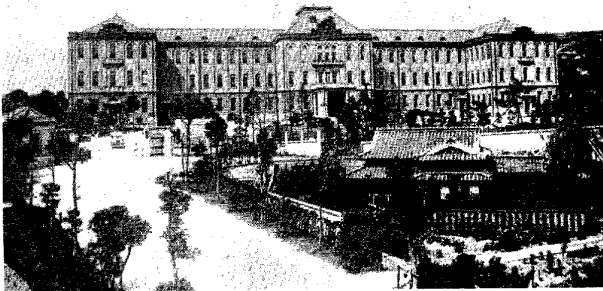


FIGURE VIII - 63. *Yawata*.  
Main office of the Yawata Iron and Steel Works.

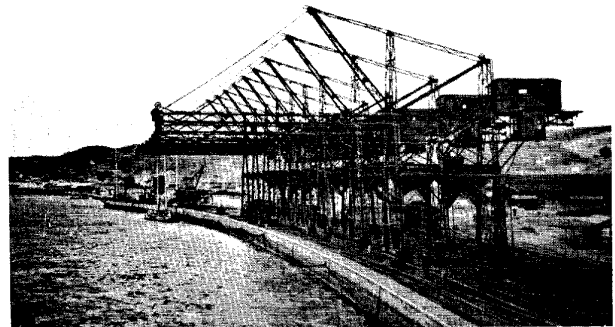


FIGURE VIII - 64. *Yawata*.  
Quay on edge of reclaimed land in Dō-kai with electric loading plant for ore and coal. Looking W.



dustry was established at Yawata, is today a major fishing port of Japan, with docking facilities for a large fleet of steam trawlers (FIGURE VIII-66). The life of the city is dominated by the overflow of heavy industry from Yawata, including a branch of the Imperial Steel Works and a large glass factory. Functionally, it is but a northern extension of the Yawata urban area.

Tobata is situated at the eastern head of Hon-kō (harbor), the entrance to Dō-kai. It lies partly on a flat of limited extent between the slopes of Kompira-yama and the shore to the west, but with a somewhat wider area of low ground to the north (FIGURE VIII-III). As in Yawata, the industrial area lies along the water and the residential area inland. Small ocean-going vessels can dock in the harbor. Tobata handles not only fish and the traffic of the industrial plants, but also shares with Wakamatsu the export of coal. Through it run both the main highway and the main railroad from Yawata to Moji, and it is connected with Yawata by electric tramway as well. The narrowing of the coastal strand between Tobata and Yawata, with the road and railroad line crowded between the hills and the bay, has created a bottleneck for land transportation. The narrowness of the channel through Hon-kō to the west, which could be blocked by a medium-sized ship turning sideways, emphasizes its position as a funnel for traffic to and from Yawata and the north.

A large number of the Korean coolies, who have been imported to work in the steel plants both in Tobata and in

Yawata, are housed in dormitories and boarding houses in the city.

There is a waterworks in the town, thought to be supplied from the same source as Yawata, and the city is connected with the northern sector of the East Kyūshū electric supply grid.

#### H. Wakamatsu (1940 population: 88,901)

Wakamatsu is the chief coal exporting port of Japan, and, with Tobata and Kokura, has received part of the overflow of heavy industry from Yawata. Its industries chiefly work on subcontracts for the plants on the southern shores of Dō-kai. It also contains the headquarters of many mining companies operating in the Chikuho coal field to the south (FIGURE VIII-67).

The city lies along the shores of the peninsula which separates the body of Dō-kai from Shimonoseki-kaikyō. The principal node of settlement is at the eastern tip, on the shores of Hon-kō across from Tobata (FIGURE VIII-III).

The city occupies reclaimed land along the north of the bay (chiefly devoted to coaling docks), and on the shores of the strait; it spreads over the lower slopes of the hills which occupy most of the peninsula.

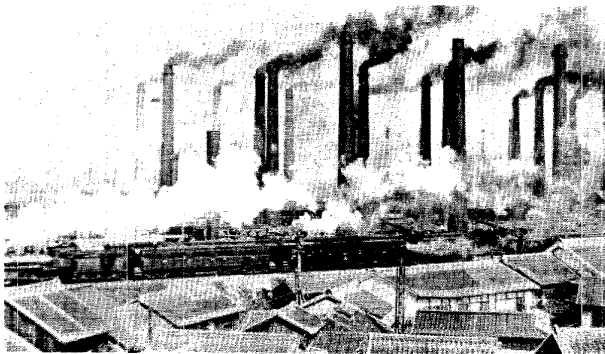


FIGURE VIII-65. Yawata.

Main railroad line in city with typical residential buildings in the foreground, and chimneys of steel plant behind. Looking N.

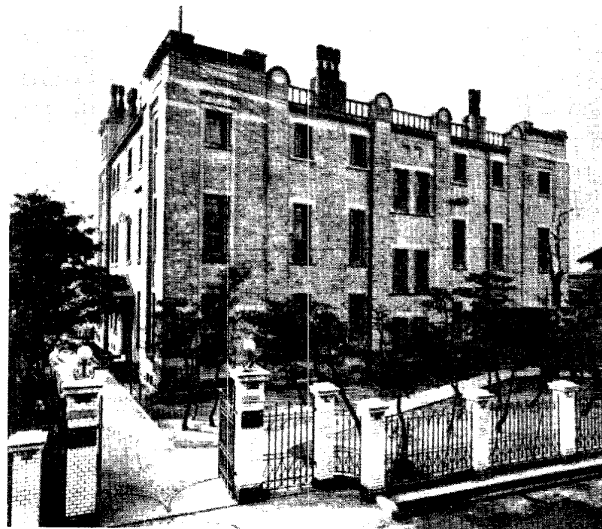


FIGURE VIII-67. Wakamatsu.

Office of branch of Mitsubishi Mining Company, Ltd. 1932.

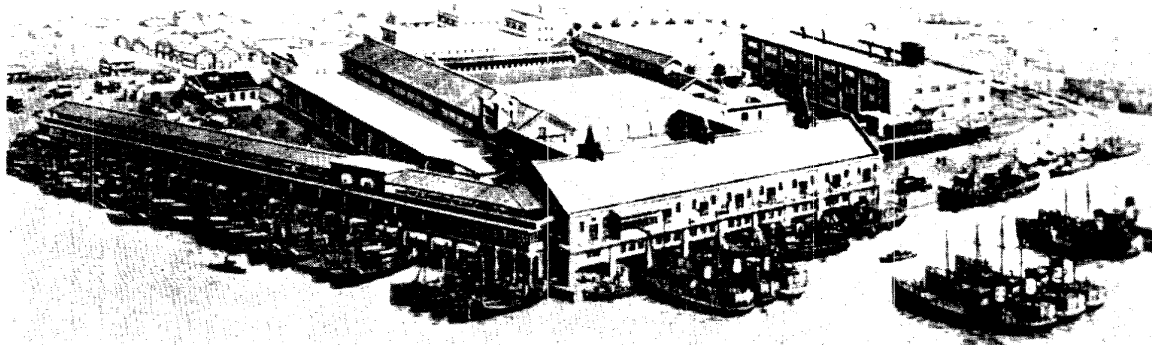


FIGURE VIII-66. Tobata.

Fishing port; dock and buildings. Looking E.





FIGURE VIII - 61. *Yawata*.  
Airview over city, steel plant, and eastern end of Dō-kai. Looking N. 1916.



FIGURE VIII - 62. *Yawata*.  
Airview over central residential area of the city, with the steel plant in the background; large open space is a baseball diamond. Looking N.

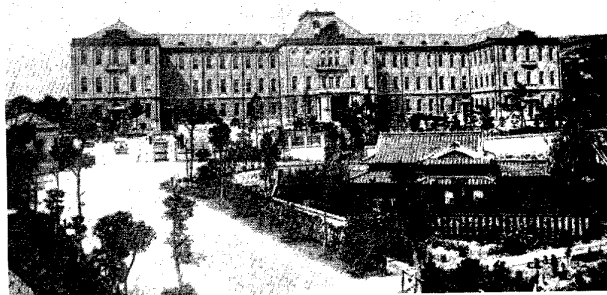


FIGURE VIII - 63. *Yawata*.  
Main office of the Yawata Iron and Steel Works.

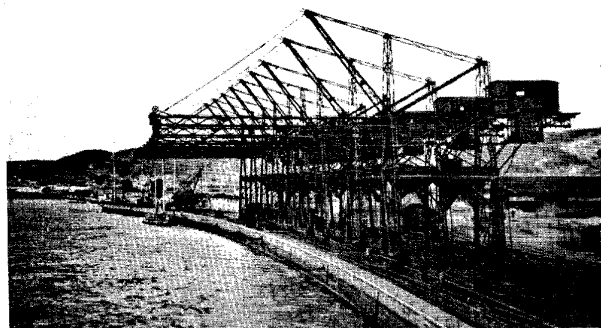


FIGURE VIII - 64. *Yawata*.  
Quay on edge of reclaimed land in Dō-kai with electric loading plant for ore and coal. Looking W.

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The city lies along the shores of the peninsula which separates the body of Dō-kai from Shimonoseki-kaikyō. The principal node of settlement is at the eastern tip, on the shores of Hon-kō across from Tobata (FIGURE VIII-III).

The city occupies reclaimed land along the north of the bay (chiefly devoted to coaling docks), and on the shores of the strait; it spreads over the lower slopes of the hills which occupy most of the peninsula.

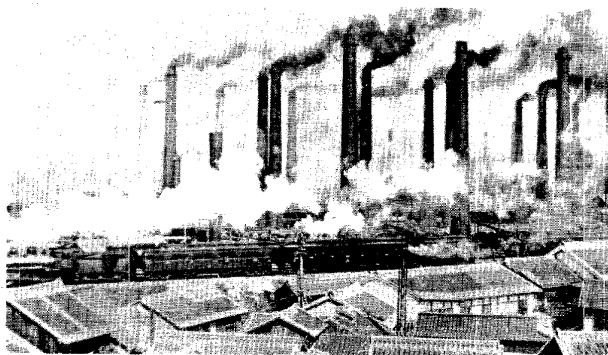


FIGURE VIII - 65. Yawata.

Main railroad line in city with typical residential buildings in the foreground, and chimneys of steel plant behind. Looking N.

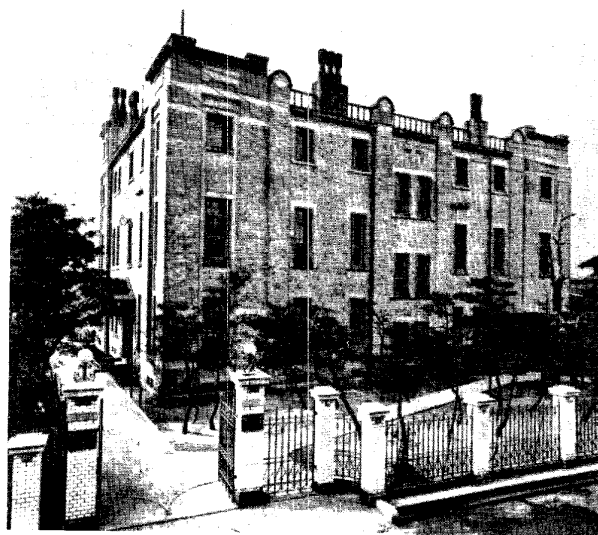


FIGURE VIII - 67. Wakamatsu.

Office of branch of Mitsubishi Mining Company, Ltd. 1932.

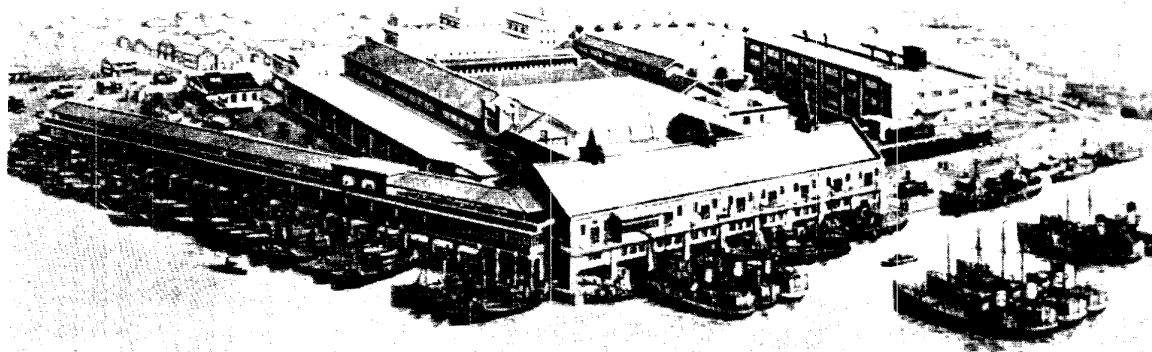


FIGURE VIII - 66. Tobata.

Fishing port; dock and buildings. Looking E.

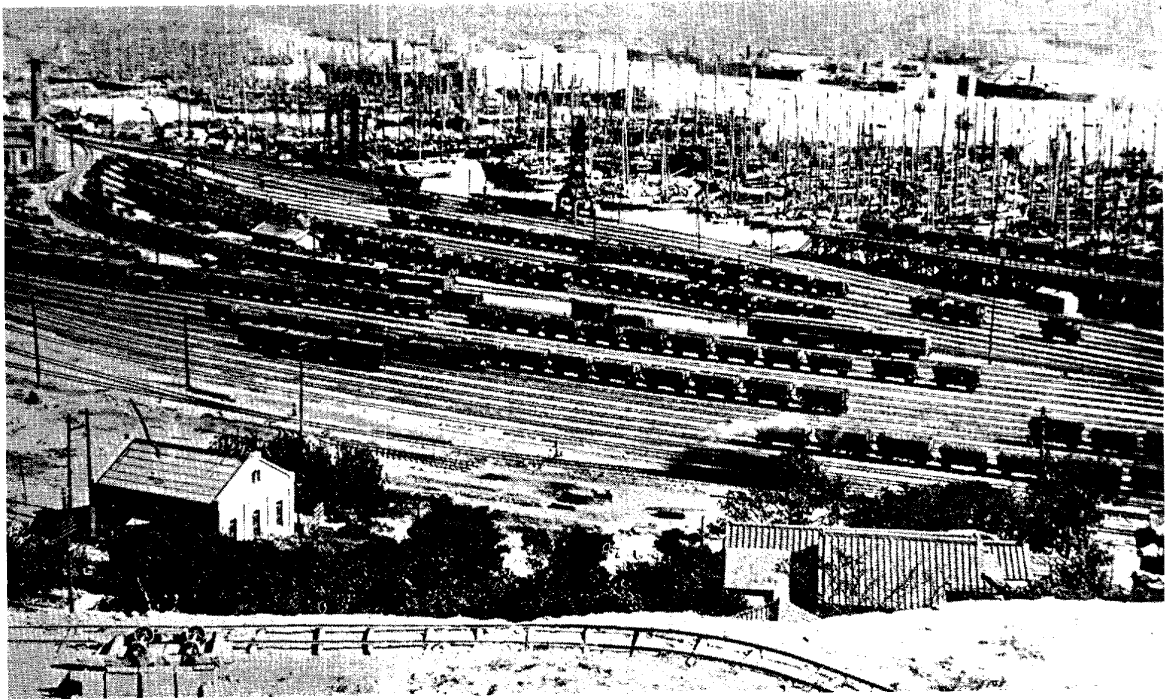


FIGURE VIII-68. Wakamatsu.

View over railroad yards and harbor, Looking SE, 1939.

The exported coal is carried to numerous ports of southwest Japan, chiefly by small sailing vessels. Some of the larger ships are still served by lighters but the deepening of channels, and the erection of improved equipment for loading coal, has brought larger ships to the docks. There are extensive rail yards behind the docks which are linked with the main line at the western end of Dōkai (FIGURE VIII-68).

The buildings of the city include, besides the industrial plants, many schools, a hospital, a post office, police stations, warehouses, and both the depot and engine house of the railroad.

The city had, in 1927, a large, complex water system with reservoirs in the hills behind the city. The electricity was derived from the northern sector of the East Kyūshū grid.

#### I. Kokura (1940 population: 178,604).

##### (1) Importance.

Although much the oldest of the cities on Shimonoseki-kaikyō, Kokura is as new as the others in its industrial aspects. Until the railroad era caused it to be displaced by Moji, Kokura was the terminus of land transportation for northern Kyūshū and, with the Kurume-Tosu zone, it is one of the two leading transportation centers of the island. One of the most important old castle towns of Kyūshū, it is today the headquarters of an infantry brigade, an infantry regiment and 2 field artillery regiments. The vast army arsenal is one of the leading producers of ordnance, small arms, and ammunition in Japan. It contains an important steel plant as well as many other factories, and the largest railroad shops in Kyūshū for both the construction and repair of equipment.

##### (2) Physical characteristics.

The city is located at a point on the southern shore of

Shimonoseki-kaikyō where the coastal strand, otherwise narrow from Tobata to Moji, widens at the mouths of 3 streams. It is bordered to the landward by low-lying rice paddies but confined by hills to the east and west (FIGURE VIII-111). The principal built-up area of the city is about 2 miles long along the shoreline, an average width of 1½ miles, and is roughly rectangular in shape. There are few open spaces, though the inland southern boundary is rather irregular.

##### (3) Means of access.

The harbor has not been developed to accommodate ocean-going vessels, and is mainly served by lighters from the Shimonoseki-Moji or Dōkai areas. From the main Moji-Kagoshima line (double-track in this section), which passes through the city parallel and adjacent to the waterfront, 2 lines run south through the eastern and western parts of the city. One of these leads south to the coal fields and the other leads southeast to Ōita.

Just west of the city, south of the main railroad and highway, is a landing field for aircraft.

##### (4) Billeting facilities.

There are extensive barracks for the different military groups which have their headquarters in the city, a number of schools, and a college.

##### (5) Buildings.

The structural complex in the western section of the city and near the waterfront (FIGURE VIII-69), is similar to that of the Tobata-Yawata-Wakamatsu area.

##### (6) Internal transportation.

The city has a street-car system which is connected with that of the Yawata area by a line which enters the city from the

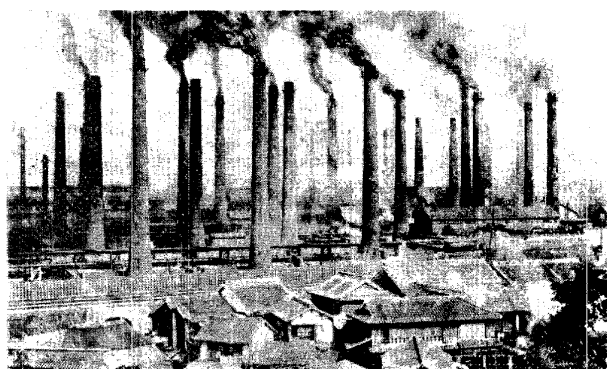


FIGURE VIII - 69. Kokura.  
Iron works with part of residential or commercial area in foreground. Before 1922.

southwest. The canalized lower courses of the rivers admit barges to industries lying back from the waterfront.

#### (7) Repair and service facilities.

Apart from the shops connected with the various industrial plants and the arsenal, the most important repair facilities are those of the large railroad shops.

#### (8) Public utilities.

Water is drawn from the Kiyotaki-gawa (river) and the Hara-gawa for the waterworks system, which is supplemented by 9,240 dug wells. Three steam power plants in the city generate electricity to supply the northern sector of the East Kyūshū grid. There is also a private steam plant supplying power to the Toyo Cement Company. There are both a gas plant and an ice plant in the city. Post, telegraph, and telephone connections are maintained with all Japan, and there is a radio broadcasting station.

#### (9) Health and sanitation facilities.

There were, in 1938, at least 2 hospitals, 27 doctors, 130 nurses, and 5 pharmacists.

#### (10) Vulnerable points.

The rail line, nearby industries along the waterfront, and the arsenal region are the most vulnerable areas.

### J. Fukuoka (1940 population: 323,217).

#### (1) Importance.

Fukuoka is the capital and largest city of the industrial and mining prefecture of the same name in northwestern Kyūshū. In addition to its function as an administrative center and its importance as the seat of Kyūshū Imperial University, it has been playing an increasingly active industrial role, a development strongly supported by the steadily mounting quantities of electric power available. Fukuoka's industrial functions were originally limited to the production of silk and cotton textiles and of a wide variety of porcelain and earthenware products. To-day it has ordnance and aircraft factories, and many firms are engaged in the manufacture of electrical products and small metal goods.

Commercially, Fukuoka serves the adjacent coastal plain and, through a valley which carries the north-flowing Ishidō-gawa (river) and the south-flowing Chikugo-gawa, the largest plain of Kyūshū, that of Kurume and Saga at the head of Shinabara-

kaiwan (gulf). The leading imports are petroleum, handled chiefly by the Rising Sun Oil Company at Saitozaki, across the bay, and timber for mine props. Coal outranks manufactured goods as an export.

#### (2) Physical characteristics.

(a) *Location.* The city of Fukuoka, 35 air miles southwest of Moji, stretches along the southeastern shore of the inner reaches of Fukuoka-wan (bay), the northernmost inlet of any size on the western coastline of Kyūshū.

(b) *Shape and dimensions.* The built-up area has the shape of a crescent with horns extending to the north and west along the curving shores of the bay. The length of the inner curve along the waterfront is between 6 and 7 miles. The outer curve bulges inland up the valleys of Ishido-gawa and Naka-gawa in the vicinity of the old town of Hakata (FIGURE VIII-70).

(c) *Degree of compactness and chief open spaces.* In the central area where the port town of Hakata and the neighboring castle town of Fukuoka, to the west, formed the twin nuclei of the present city, there is a heavy concentration of population and buildings. This is interrupted by only 3 open areas: 1, the 200 acres of fortress grounds around Fukuoka castle; 2, West park, dominated by the knob of Aratsu-yama (hill), lying to the northward of the castle grounds on a blunt promontory of the shoreline; and, 3, the university campus area which stretches for nearly 2 miles along the shore north of the Ishidō-gawa, Itara-gawa to the north and the Muromi-gawa to the west mark the approximate present limits of the built-up area along the bay. The sharp hill slopes south of Fukuoka town abruptly limit settlement there, but inland from Hakata, town settlement straggles irregularly along the streams, roads, and rail lines (FIGURE VIII-70).

(d) *Differentiated areas.* The commercial and administrative center of the town lies along and to the west of the canalized lower channel of Naka-gawa (FIGURE VIII-71). The old industrial area was established on the waterfront of Hakata port, between the mouths of the Ishido-gawa and the Naka-gawa. New industries have developed on reclaimed land to the southwest, but many of the plants lie within residential areas on the inner border of the city, notably those of the Nippon Rubber Company, the Kanegafuchi Spinning Mill, and the Watanabe Iron Works (FIGURE VIII-72). The most clearly defined residential area lies around Hakozaki, inland from the university area, but even here there are industrial plants and residences.

(e) *Street plan.* Locally, the streets follow roughly rectangular grids, the dominant orientation in any locality having been influenced chiefly by the direction of the adjacent shoreline. The river-mouth canals and the railroads have exerted secondary influences (FIGURE VIII-70).

#### (3) Means of access.

(a) *Water.* Unless very recent harbor improvements have altered conditions, only small ocean-going and coastwise freighters can enter the bay. Moreover, sea-going vessels have been unable to tie up to any dock or pier on the city side of the bay, but must be unloaded into lighters. Across the bay at Saitozaki, however, there is a naval coaling station with a depth of nearly 20 feet alongside the dock.

(b) *Rail.* A major branch of the Kyūshū railroad system leads northwest to Moji, and 2 lines, one a high-speed electric

FIGURE VIII - 71. *Fukuoka.*

Airview of center of city west of Naka-gawa. Looking W. 1931.

- |   |                           |
|---|---------------------------|
| 1. Naka-gawa.                             | 6. Daimyo-machi (street). |
| 2. Bridge of Gofuku-cho.                  | 7. City hall.             |
| 3. Mouth of canal joining Naka-gawa.      | 8. Prefectural office.    |
| 4. Hakata-wan.                            | 9. Post office.           |
| 5. West park and the knob of Aratsu-yama. | 10. Broadcasting studio.  |

FIGURE VIII - 72. *Fukuoka.*

Airview of inland portion of Hakata town; Kanegafuchi Spinning Mill (left foreground). 1930.



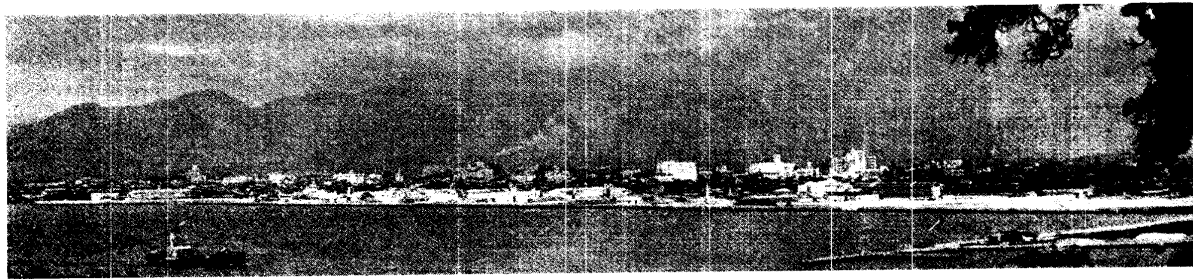


FIGURE VIII-73. *Fukuoka.*  
View of skyline from bay, Looking E., 1937.

road, run southwest to Kurume. Another line, connected with the main network at Fukuoka leads west and southwest to Karatsu. Two short lines of undetermined gauge lead to coal mines in the hills to the east, and an electric line runs west through the town and along the shore to Imajuku. A line around the north end of the bay connects Fukuoka with 3 different airfields and the petroleum storage facilities at Saitozaki.

(c) *Road.* National highways lead northeast to Moji, east to Hizuka, and southeast to Kurume. The network of roads to the south and southwest is composed of secondary highways, but Sasebo and Nagasaki can be reached over national highways by way of Kurume and Saga.

(d) *Air.* There is a civil airport on the inland side of the northern end of the bay, about 5 miles north of the center of the city. Directly west across the bay, on the inner shore of Uminonakamichi (peninsula), is a naval air station with facilities for both land and sea planes. A seaplane base, nearest to the city of the three, lies on the northern shore of Najima peninsula, just north of the mouth of Tatara-gawa and adjacent to the Najima power plant.

#### (4) *Billeting facilities.*

The most suitable billeting facilities are the barracks in the fortress area. There might also be extensive accommodation in the many schools, the buildings of the university, the Kyo-shintei Hotel (with a capacity of 24 guests), and the Fukuoka Hotel (FIGURE VIII-70).

#### (5) *Buildings.*

The skyline silhouettes the many large, western-style buildings which are chiefly grouped along the lower Naka-gawa (FIGURE VIII-73). An airview of this part of the city, however, indicates that the customary 1-story, tile-roof, wooden building is the predominant structural type, even near the center of the city (FIGURE VIII-71). The extensive university buildings compare favorably with those of many Western institutions (FIGURE VIII-74). The new industrial buildings such as those of the Nippon Rubber Company and the Kane-gafuchi Spinning Mills are large, well-lighted, reinforced concrete structures (FIGURES VIII-71 and VIII-72).

#### (6) *Internal transportation.*

The network of street-car lines is supplemented by boat transportation along the waterfront and up the canalized lower courses of the rivers (FIGURE VIII-70).

#### (7) *Repair and service facilities.*

The self-contained, vertical organization of Japanese industrial plants make it certain that there are adequate shop



FIGURE VIII-74. *Fukuoka.*  
Main office of Kyūshū Imperial University.

facilities at the plants of the different industrial firms, notably those of the Watanabe Iron Works.

#### (8) *Public utilities.*

(a) *Water.* The well water on the Fukuoka plain is distinctly brackish, but an adequate supply of water was available in 1927 from reservoirs on Muromi-gawa south of the city. The urban distribution system was then reported to be adequate. Undoubtedly the large increase in population of recent years, and the establishment of water-consuming plants such as that of the Nippon Rubber Company, have necessitated large extensions.

(b) *Power.* Fukuoka is supplied with power from the West Kyūshū grid. The nearest plant to the city, the Najima generating station, lies on a stubby peninsula just north of the mouth of Tatara-gawa.

(c) *Gas.* There is a gas plant on the northeast bank of lower Ishidō-gawa.

(d) *Communications.* Telephone and telegraph connections exist with all of the main islands. There is a radio broadcasting station within the city (FIGURE VIII-70) and there are broadcasting towers at both the Najima seaplane base and the naval air station.

#### (9) *Warehouses and storage.*

There are many warehouses adjoining the wharves at the port of Hakata town. The most important storage facilities in the area are those for oil and coal at Saitozaki, across the bay.

#### (10) *Health and sanitation facilities.*

In addition to the large well-equipped hospital attached to the medical college there were, in 1938, at least 4 other hospitals and 1 convalescent home, 22 doctors, and 38 nurses in the city. The city has a drain-pipe sewerage system.

#### (11) *Vulnerable points.*

Because Fukuoka is a bottle-neck for transportation, the most vulnerable points in the city would be the main railroad stations and the adjacent yards and facilities. Outside the city limits, the Najima peninsula with its power plant and seaplane

base, and the oil-tank farm at Saitozaki are other important small areas.

## 86. West-central Kyushu

### A. Introduction.

The west-central area of Kyūshū consists of 2 parts, the much embayed northwestern peninsula of the island and an area bordering Shimabara-kaiwan (gulf) and Yatsushiro-wan (bay) on the north and east. The former area is uniformly rugged, whereas the latter contains 2 large, densely settled, agricultural plains around Kurume and Kumamoto.

The chief concentrations of population in the more thinly occupied peninsula are found near the naval base of Sasebo and the port of Nagasaki. Among the less important centers are Omura with its nearby naval air base and Karatsu, a coal-exporting and steel-producing port. Agriculture is much less intensive than in the area to the east; coal mining and forestry are, in consequence, relatively more important.

Several of the cities of the eastern section, such as Saga, Kurume, and Kumamoto, are commercial and administrative centers for the adjacent agricultural plains. Saga and Kumamoto are also the locations of important army garrisons. There has recently been a marked increase of manufacturing activity in the area, not only in the Mitsui-sponsored mining and industrial complex at Omura-Milke, but in the other cities as well. Kurume has become an important rubber-processing center, and Saga has acquired an important war industry in the Togami Electric Works.

The rugged portion of this eastern section, south of the Kumamoto plain, is chiefly important for mineral and forest products, the industries which process them, and the hydro-electric plants which supply power to the industries. Yatsushiro is noted for the production of pulp and paper. Both electro-chemical and electro-metallurgical industries are located at Kagami and Minamata.

Other cities and towns in both parts of the area vary widely in function. Tosu, north of Kurume, and Isahaya, northeast of Nagasaki, are important railroad junctions with extensive marshalling yards. Imari and Arita, in the transition zone between the 2 main parts of the area, share an active porcelain industry with Saga.

Strategically situated to form a defense bulwark for more vital areas, west-central Kyūshū also has a major place in the war economy of Japan.

### B. Sasebo (1940 population: 205,989).

#### (1) Importance.

Sasebo is one of the 4 principal naval bases in Japan. It has facilities for the servicing and repair of all types of naval units and a harbor that can accommodate a great fleet. As a closed port, it has no foreign trade, but the needs of the base and the adjacent city attract many Japanese commercial vessels. The industrial potential of the naval arsenal and the dockyards is undoubtedly large. The town itself is the site of a large naval aircraft factory, and 2 miles southeast of the city there is an aircraft assembly plant. Sasebo port derives importance, as well, from its central situation with regard to Hizen-hantō (peninsula) coal field. Apart from the coal, however, its dependence upon its hinterland is slight.

#### (2) Physical characteristics.

(a) *Location.* Sasebo, the westernmost city in Japan, lies on the shore of Tsushima-kaikyō (strait) at the northwestern tip of Kyūshū, guarding the important narrows between Japan and the East China seas, and the western entrance to the Inland Sea. The city and the adjacent naval base (FIGURE VIII-75, inset) lie on the northern shore of Sasebo-wan (bay), which is the inner harbor of the base, and the northeastern inlet of Sasebo-ko (harbor). Sasebo-ko, in turn, is the only entrance to the large, almost enclosed, Omura-wan. The city and the northeastern part of the base are built on the deltas of 3 rivers, the south-flowing Sasebo-gawa and 2 smaller streams paralleling it on the east. Some of the waterfront of the city and a large part of the naval base to the southwest occupy reclaimed land. Moderately steep hill slopes hem in the naval base and the northeastern border of the town, but a small plain opens out to the north along the upper reaches of Sasebo-gawa.

(b) *Shape and dimensions.* The city area extends in a northwest-southeast direction along the shore of the bay and up the lower valley of Sasebo-gawa for a distance of about 2½ miles. It exceeds a width of ½ mile only along the valleys, up one of which it extends about 1.3 miles. The naval base occupies an east-west oblong area of about the same size, directly to the west, and includes all the remaining northern shore of Sasebo-wan. The other shores of this inner harbor are, however, lined by a variety of installations connected with the base (FIGURE VIII-75).

(c) *Degree of compactness and chief open spaces.* The base and the central and southeastern sections of the city are very closely built up between the hills and the sea. Toward the northeastern fringe, however, there are open spaces, notably the areas of higher ground between the 3 valleys.

(d) *Differentiated functions.* Although the city exists almost solely to service the base and to house its laboring personnel, the two form separate entities. The lower course of Sasebo-gawa is the principal dividing line, but a few hundred yards upstream the boundary cuts west in a curving line, so that part of the business center of the city is also west of the river. This, with a larger area east of the channel, which continues south abreast of the naval base, constitutes the commercial and administrative core of the city. Along the waterfront is an industrial zone, including an aircraft factory, a gas plant, and minor industrial establishments.

#### (3) Means of access.

(a) *Water.* Access by sea is through the 800-yard wide entrance to Sasebo-ko, about 5 miles southwest of the city, and thence into Sasebo-wan, the inner harbor. There is safe anchorage for a very large number of ships in the sheltered outer harbor, or in the waters of nearby Omura-wan. Elaborate docking facilities extend for nearly 3 miles along the waterfront.

(b) *Rail.* One rail line enters the city from the southeast and passes through it and across the mouth of the Sasebo-gawa into the base. A short distance east of the city, there is a junction of lines from Saga and Nagasaki which, in turn, are connected with the main network of the island. Another line, the gauge and precise course of which within the city are unknown, runs north from Sasebo approximately 3 miles to a junction from which an east branch extends approximately 1 mile to a



mine, and a west branch extends approximately 4 miles to Ainoura.

(c) *Road.* A national highway enters the city from the east along the line of the railroad. It provides access from Nagasaki to the south and is connected with the main system of national highways at Saga. Secondary roads from the northeast of the city lead to Ainoura, Shiza, and Imari, and thence to Karatsu and Fukuoka.

(d) *Air.* A naval airport, accommodating both land and sea planes, occupies the tip of a small hilly peninsula which forms the eastern headland of the inner harbor.

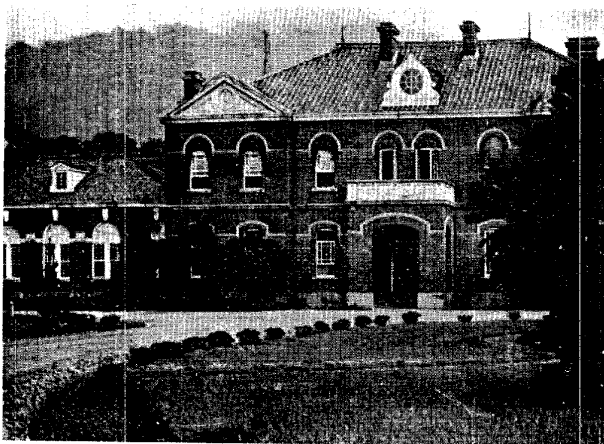


FIGURE VIII-76. Sasebo.  
Third Naval Admiralty, 1930.

#### (4) *Billeting facilities.*

The naval base contains an extensive barracks area which houses both naval personnel and part of the laboring and technical force of the base. A number of schools are scattered throughout the city.

#### (5) *Buildings.*

Although many buildings are of brick, concrete, or ferro-concrete construction (FIGURE VIII-76), wood is the predominant structural material.

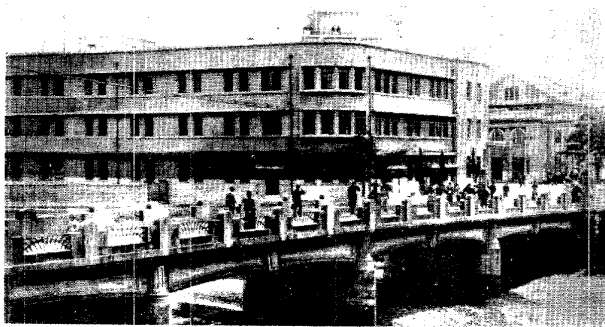


FIGURE VIII-77. Sasebo.  
Bridge over Sasebo-gawa with naval academy in background.  
Looking W.

#### (6) *Internal transportation.*

Transportation from the city to the naval base is provided chiefly by bus for those who do not walk or cycle. There are many bridges across Sasebo-gawa (FIGURE VIII-77). Ferries

operate from a wharf to the east of the mouth of Sasebo-gawa, presumably to the airport or other outlying installations.

#### (7) *Repair and service facilities.*

Extensive and complete facilities for marine repairs exist at the base. These include 3 slips and at least 7 drydocks, the largest of which is nearly 800 feet long. There is also a large aircraft repair depot.

#### (8) *Public utilities.*

(a) *Water.* In 1927, a population about half as great as the present one was served from the water supply system of the naval base and from more than 2,000 dug wells. There were 252 public outlets and 278 fire hydrants in the town.

(b) *Power.* There is a fuel oil stand-by plant at the naval base, but Sasebo derives its electric power mainly from the west Kyūshū grid. The high-tension power line enters the city from the north.

(c) *Gas.* The gas plant lies on the waterfront just northwest of the railroad station.

(d) *Communications.* The Post and Telegraph Office, the center of telephone and telegraph communications, lies immediately to the west of the navy bridge (FIGURE VIII-77). There are 2 radio stations in the area (at 33° 09' N, 129° 42' E and 33° 08' N, 129° 44' E).

#### (9) *Warehouses and storage.*

Oil tanks and coal-storage depots are scattered along both shores of the inner harbor south of the naval base and the city. There are warehouses along the waterfront, particularly in that part of the base closest to the town.

#### (10) *Health and sanitation facilities.*

There is a large naval hospital within the base. Another hospital with 24 beds, and at least 11 doctors, 20 nurses, and 2 pharmacists, is located in the city.

#### (11) *Vulnerable points.*

In addition to the base itself, the most vulnerable points include: 1, the oil and coal-storage facilities along the shores of Sasebo-wan; 2, the naval aircraft factory; 3, the aircraft assembly plant southeast of the city; and 4, the railroad station.

#### (12) *War damage.*

Considerable damage to the base is reported from the recent raid of the 20th Air Force.

### C. Nagasaki (1940 population: 252,630).

#### (1) *Importance.*

Nagasaki owes its importance to its excellent natural harbor rather than to its rugged and relatively thinly populated hinterland. Although not well situated to become a major port of the country, it has served as such because of its historical priority in foreign trade and its accessibility to Shanghai and the major trading ports of southeastern Asia. Once prominent as a coaling port and as the base of a large fishing fleet, it has declined in both respects with the general adoption of oil as a marine fuel and with the transfer of many of its fishing vessels to Tobata. Although it was the third port in Japan in foreign trade half a century ago, it has now declined to ninth rank.

The excellence of its site for the establishment of shipyards has resulted in its becoming, with Kōbe and Kure, one of the

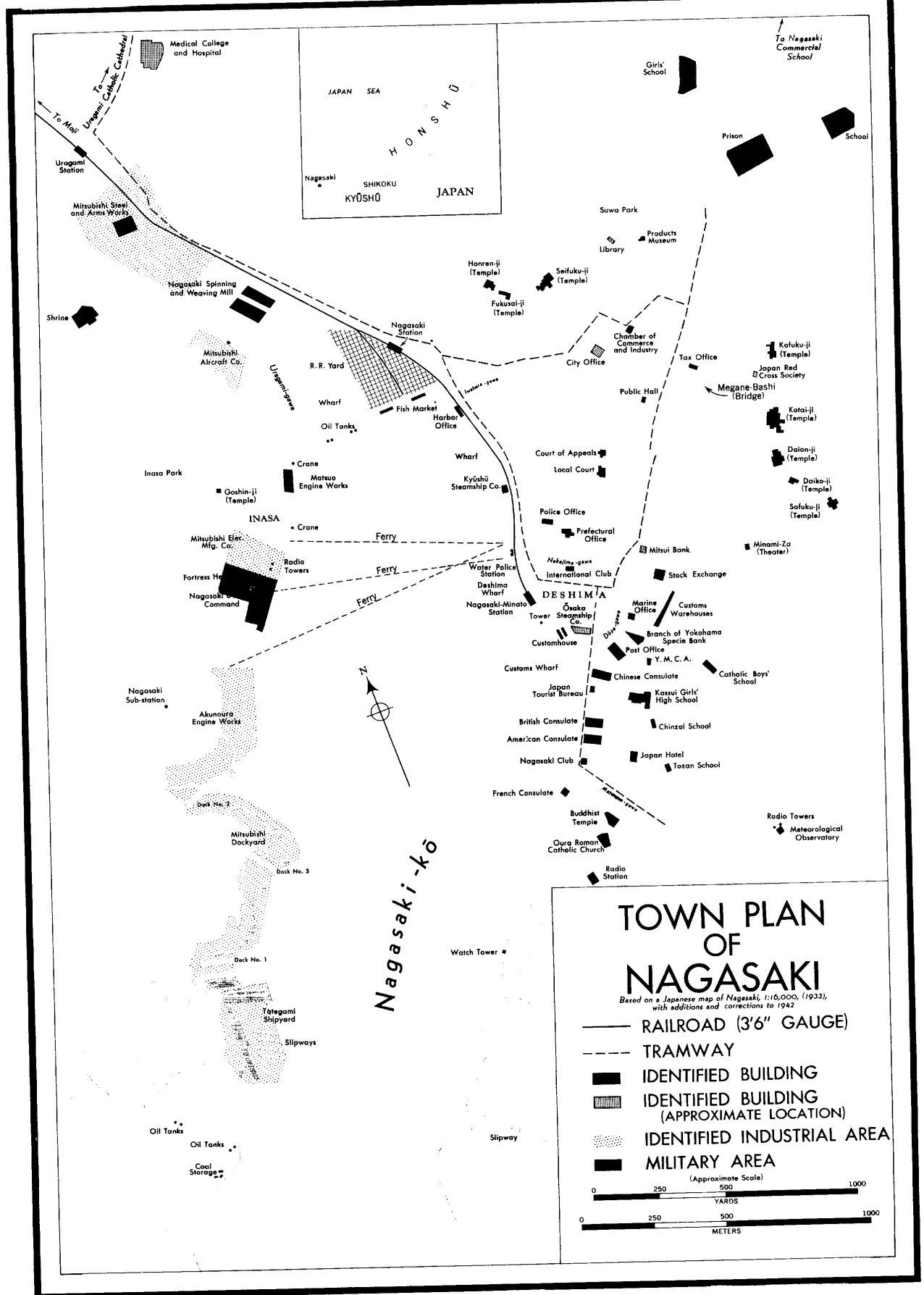


FIGURE VIII - 78  
JANIS 84  
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FIGURE VIII - 79. Nagasaki.  
Panorama of city and harbor. Looking SW.

3 major shipbuilding centers of the Empire. The Mitsubishi Dockyard, the Tategami Shipyard, and the Koyagishima Shipyard of the Matsuo Iron Works together account for  $\frac{1}{3}$  of the capacity of commercial shipbuilding and repair facilities of Japan. The associated Akunoura Engine Works is one of the largest producers of marine engines in the country. The development of these industries, and of other industrial plants, has been greatly aided by the accessibility of coal on Taka-shima ( $32^{\circ} 40' N$ ,  $129^{\circ} 45' E$ ), the outermost of the islands which guard the entrance to Nagasaki-kō.

Domestic trade is of much greater importance than foreign trade, imports far exceeding exports in the latter. Incoming raw cotton, metals, and petroleum outrank exports of coal, cotton yarn, fish, and refined sugar in value.

**(2) Physical characteristics.**

(a) *Location.* The city and its industrial establishments line the head and sides of narrow Nagasaki-kō (harbor) for 3 miles from the sea. The inlet lies near the extreme southern tip of the highly irregular, southward curving, northeastern peninsula of Kyūshū. There was little natural flat land on the shoreline and most of the industrial establishments occupy reclaimed land (FIGURE VIII-78).

(b) *Shape and dimensions.* The extreme boundaries of the urban area, including the harbor, measure 5 miles east - west and 5 miles north - south, but a large part of the hill land within these limits is not occupied. The built-up area coincides with the configuration of the bay-head and river valleys which it occupies; the settled region covers the reclaimed land, the coastal strand which is narrow except inland from the northeastern and northern shore of the bay, and parts of the surrounding slopes, in a plan resembling that of a gigantic amphitheater (FIGURE VIII-79).

(c) *Degree of compactness and chief open spaces.* The absence of open spaces within the built-up areas is due to the pressure of a large population on limited level ground. After the level areas were occupied, settlement advanced up the valleys of the Urakami-gawa and Nakajima-gawa and into ravines which gash the hillsides, and ascended the steep slopes, only the higher parts of which now remain unoccupied (FIGURE VIII-80). Settlement is especially concentrated on the extensive area of flat ground just to the northeast of the harbor head.

(d) *Differentiated sections.* The extensive shipyard area occupies a frontage of more than 2 miles along the west side

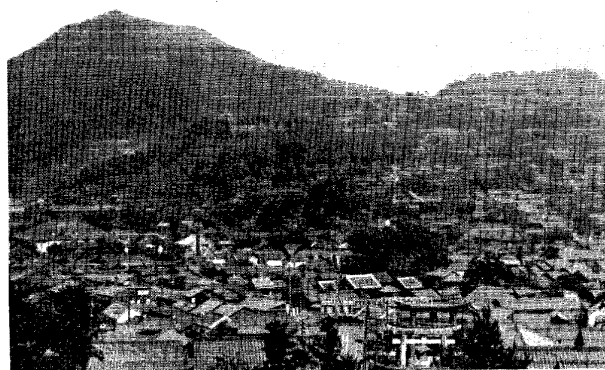


FIGURE VIII - 80. Nagasaki.  
Settlement on the slopes of the hills on the east side of the harbor. Looking E, 1922.

of the bay. North of it is a military zone; other industrial developments occupy land on both banks of the lower Urakami-gawa (river). Between this river and the railroad line are a large textile mill, several fish-packing plants, and sawmills. The principal commercial center lies along, or near, the waterfront between Dōza-gawa and Matsugae-gawa. The core of this section is the former island of Deshima, a triangular area between the Nakajima-gawa, the Doza-gawa and the bay. Here are the chief harbor offices, administration buildings, banks, and business houses. To the north is the main residential district of the Japanese, to the east a small Chinese quarter, and to the south, on both sides of Matsugae-gawa, the chief concentration of residences for Europeans. Recent industrial developments have taken place farther south on the eastern shore.

(e) *Street plan.* The strongest influences on the street pattern were exerted by the relief and the directions of shorelines and streams. Marked irregularity characterizes the street pattern on the terraced slopes. The principal business thoroughfare, the Bund, parallels the shoreline and the northern bank of the lower channel of the Nakajima-gawa (FIGURE VIII-78).

**(3) Means of access.**

(a) *Water.* The deep harbor is 3 miles in length and varies from  $\frac{1}{2}$  mile to 1 mile in width. The floor of the bay shelves very rapidly near the head of the harbor, and only smaller ocean-

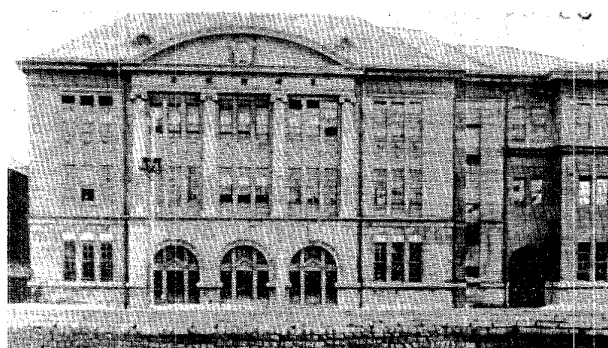


FIGURE VIII - 81. *Nagasaki.*  
Post and telegraph office, 1930.

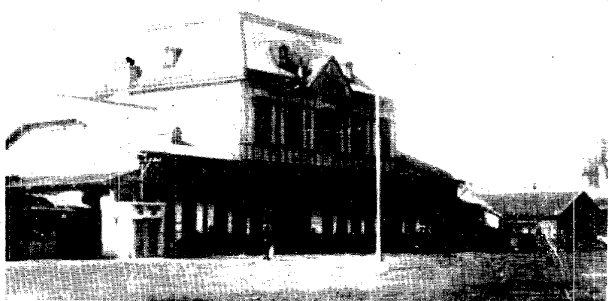


FIGURE VIII - 82. *Nagasaki.*  
Nagasaki railroad station.



FIGURE VIII - 83. *Nagasaki.*  
Typical thoroughfare with street-car line.

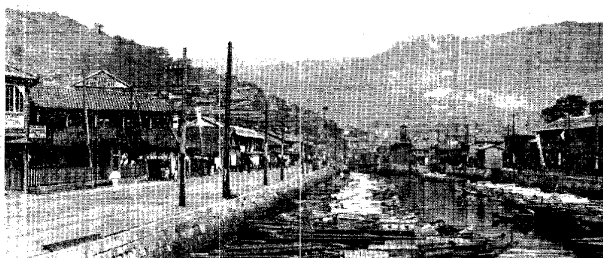


FIGURE VIII - 84. *Nagasaki.*  
Canal in center of city, E of bay, 1922.

going vessels can dock at the quay on the shoreline of Deshima. Ships of more than 10,000 tons are served by lighters, of which there are several hundred (FIGURE VIII-79).

(b) *Rail.* Nagasaki is the terminus of the branch of the main Moji-Kagoshima route of the Kyūshū railroad system, which leaves that line at Tosu and enters the city, slightly west of north, by the narrow, tortuous valley of the Uragami-gawa. There is no other rail connection. Within the city area are 3 railroad stations: from north to south, the Uragami, Nagasaki, and Deshima depots.

(c) *Road.* There is only one through road connecting the city with the rest of the island, a national highway which descends the valley of the Nakajima-gawa from the northeast. Second-class roads, roughly paralleling the coast, provide access from Seto to the northwest and Kabashima to the south; another road winds east across the hills to Moji on Amakusanada (sea).

(d) *Air.* A civil airfield, with facilities for both land and sea planes, has been built on reclaimed land along the eastern shore of the harbor near its entrance.

#### (4) *Billiting facilities.*

The fortress area on the west side of the bay must contain extensive barracks. Scattered throughout the city are many schools. Such buildings as the Y.M.C.A., the Nagasaki Club, and the Japan Hotel (with accommodations for 50 guests) would provide limited additional facilities.

#### (5) *Buildings.*

There are a number of substantial modern stone and concrete buildings, such as the Post and Telegraph Office (FIGURE

VIII-81) in both the industrial and commercial areas. Nevertheless wooden, tile-roof structures, such as the main railroad station (FIGURE VIII-82) are more common (FIGURES VIII-79, VIII-80, VIII-83, and VIII-84).

#### (6) *Internal transportation.*

Both streetcars and busses operate throughout the city on the east side of the bay (FIGURE VIII-83). The canalized lower courses of the rivers are used by a variety of small boats, concerned primarily with freight (FIGURE VIII-84). Ferries provide frequent service across the bay.

#### (7) *Repair and service facilities.*

The extensive shipyards have at least 3 drydocks and at least 1 marine railway. Non-marine repairs could be made at a variety of plants such as the Mitsubishi Electric Manufacturing Company, the Mitsubishi Steel and Arms Works, and the Mitsubishi Aircraft Factory.

#### (8) *Public utilities.*

(a) *Water.* In 1938, Nagasaki had a water system based upon a series of dams and reservoirs fed by streams and springs in the hills to the northeast. There were, in addition, 870 wells. The townspeople consider the water excellent, but dwellings, gardens, and paddy fields occupy a slope which drains into the ravine where the reservoirs are located. Pollution has been the probable cause of several typhoid epidemics.

(b) *Power.* Nagasaki derives its power from the West Kyūshū grid. Just northwest of the mouth of Uragami-gawa is a steam power plant which contributes power to this network. On the terraced slopes of the hills behind the Akimoura Engine Works is a regulating and distributing station. A

hydroelectric plant is believed to be associated with one of the dams in the hills northeast of the town.

(c) *Ice.* There are several ice plants on reclaimed land northeast of the mouth of Uragami-gawa.

(d) *Communications.* The Nagasaki Post and Telegraph Office (FIGURE VIII-81) is the center of civil communications by post, telegraph, and telephone and maintains telegraph and telephone connections with the rest of Japan. Cables to Shanghai and Vladivostok have termini near the mouth of the harbor. There are radio broadcasting towers beside the meteorological station in the hills of the southeastern part of the city and just north of the fortress headquarters on the west side of the bay. A radio station is located in the town near Matsugae-gawa (FIGURE VIII-78).

#### (9) Warehouses and storage.

Thirty large warehouses line the shore from the main railroad station to the southern end of Deshima quay (FIGURE VIII-78).

#### (10) Health and sanitation facilities.

In 1938, Nagasaki had at least 1 hospital, 1 convalescent home, and 2 clinics. The hospital, which had 110 beds, was undoubtedly that of the Medical College near the northern limits of the town (FIGURE VIII-85). The convalescent home had 60 beds, and there were at least 6 doctors and 16 nurses in the city. No closed-pipe sewerage system had been reported as late as 1940.

#### (11) Vulnerable points.

Some of the points whose destruction would most seriously disrupt the normal functioning of the city are: 1, the steam power plant; 2, the Post and Telegraph office; 3, the water reservoirs northeast of the city; 4, the single highway leading out of the city to the northeast; and 5, the single railroad line in the upper valley of Uragami-gawa.

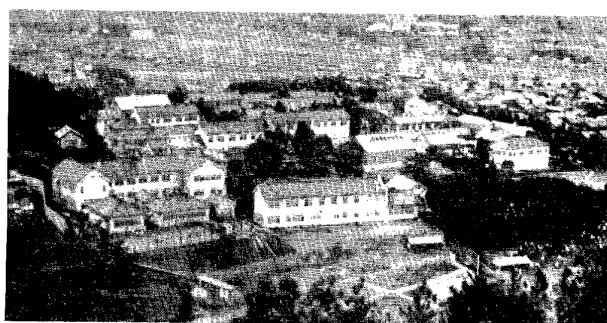


FIGURE VIII - 85. Nagasaki.

Airview of Medical College and hospital buildings. 1930.

### D. Kurume (1940 population: 89,490).

#### (1) Importance.

Kurume is an army center, a rail hub, a rubber-manufacturing point, and the site of an arsenal. The Bridgestone Tire Company plant of the Nippon Rubber Company produces 23% of Japan's tires and tubes.

#### (2) Physical characteristics.

The city is centrally located in the Saga-Kurume-Ōmura plain, a large, densely populated, alluvial lowland extending inland from the head of Shimabara-kaiwan. The chief stream draining the plain, Chikugo-gawa, passes the northwestern

corner of Kurume about 12 miles from its mouth. Oblong in shape, Kurume extends about 2 miles from east to west and 1 mile from north to south. The main streets, surrounded by the most densely populated section, run approximately east-west through the center of the city. The chief industrial sections border the river in the northwest and the military areas are in the southwestern section.

#### (3) Means of access.

(a) *Land.* The main north-south line from Moji to Kagoshima is met at Kurume by a transisland line from Ōita on the east coast and a connection with the Nagasaki branch by way of Saga. The Nagasaki branch joins the main line 5 miles north of the city at Tosu, where the largest marshalling yards in Kyūshū are located. Two electric railroads, the Kyūshū Express Line from Fukuoka to Fukushima and a local line to outlying communities, pass through the eastern part of Kurume. The roads entering the city follow approximately the same routes as the steam railroads.

(b) *Air.* Two army airfields, a medium airfield at Tachiarai and a fighter airfield, are located 9½ and 2½ miles northeast of the city respectively.

#### (4) Billeting facilities.

Three groups of buildings, all in the southeastern part of the city, constitute the permanent station of the 12th Army Division. Most of the barracks are in the 2 groups farthest from the city center; the group nearest the center contains the division headquarters and an arsenal (FIGURE VIII-86). Several large schools offer additional accommodations.

#### (5) Buildings.

The following are important buildings:

- Nippon Rubber Company's 2 plants (FIGURE VIII-87).
- Tsuchiya Tabi Company (rubber footwear).
- Kanegafuchi Spinning Mill.
- Municipal office.

#### (6) Internal transportation.

An electric street car system of 2 east-west lines and a line to Hana-batake on the southern outskirts serves the city.

#### (7) Public utilities.

(a) *Water.* A filtration plant and 2 small lakes are located 2 miles east of the city.

(b) *Power.* The city is included in the western subarea of the Kyūshū power network.

(c) *Gas.* A gas plant is located in the southwestern part of the city near the Tsuchiya Tabi Company's plant.

#### (8) Warehouses and storage.

Warehouses are concentrated near the railroad station and yards in the western part of the city.

#### (9) Health and sanitation facilities.

The hospital of the Kurume medical school lies on the north outskirts of the city.

#### (10) Vulnerable points.

The following are some of the vulnerable points:

- Tosu marshalling yards.
- Steam railroad bridge across Chikugo-gawa northeast of city.
- Arsenal and divisional headquarters.
- Rubber factories.



FIGURE VIII - 86. *Kurume.*  
Airview of central portion of city. Looking NE. 1936.

E. Ōmuta-Miike (1940 population: 177,034).

(1) *Importance.*

The manufacturing city of Ōmuta, the adjacent coal port of Miike, and the underlying Miike coal fields form an important industrial area of varied character. The Mitsui interests control the mines, the port, and most of the factories, and the community is virtually a company town. The industrial plants, which employ Miike coal either as a fuel or as a raw material, include the 2 largest zinc refineries in Japan and a synthetic oil plant. The port of Miike ranks sixth among Japanese ports in foreign tonnage; 90% of its exports are coal, and a large share of its imports are raw materials for the factories.

(2) *Physical characteristics.*

The Ōmuta-Miike area is located at the southern end of the large Saga-Kurume-Ōmuta plain on the northeastern coast of the Shimabara-kaiwan. The city of Ōmuta is crossed by Ōmuta-kawa and Suwa-gawa; southwest of the mouth of Suwa-gawa is Miike-kō, the port; northeast of Ōmuta, across Domen-gawa, is the village of Miike, which has given its name to the port and coal fields. The streets of Ōmuta run

generally north-south and east-west; the most important exceptions are roads leading in from neighboring settlements. The chief industrial establishments are arranged in a semi-circle along a belt-line coal railroad; the majority are in the northeast. Large undeveloped tracts intervene between the older part of Ōmuta and the port area; these 2 sections function to some extent as separate cities.

(3) *Means of access.*

(a) *Water.* Miike-kō, the largest completely artificial harbor in Japan, consists of an inner and an outer basin reached by a channel between long breakwaters (FIGURE VIII-88). Large ocean-going freighters use only the outer basin. The mouth of the Ōmuta-gawa is used by small craft.

(b) *Rail.* The main line from Moji to Kagoshima passes through the city from north to south.

(c) *Road.* Ōmuta is on a secondary highway from Saga to Kumamoto; there are connections at these points with national highways.

(d) *Air.* An emergency landing ground is located 1½

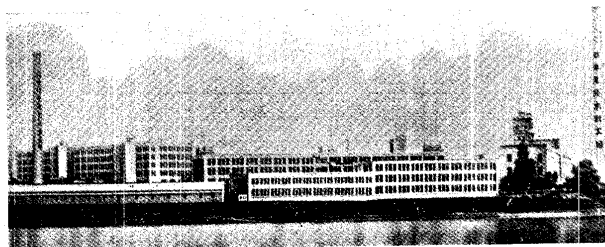


FIGURE VIII - 87. *Kurume.*  
Nippon Rubber Company. Looking SE. Original plant at right; portion of former Bridgestone Tire Company at left; Chikugo-gawa in foreground.

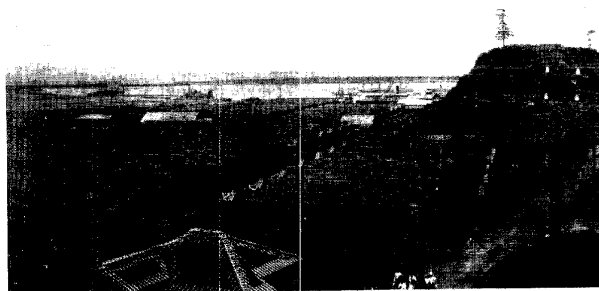


FIGURE VIII - 88. *Ōmuta-Miike.*  
Portion of outer basin of Miike-kō. Looking NW. Coal mine workers' houses in foreground.



Confidential

CITIES AND TOWNS

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miles east-northeast of Ōmuta; a seaplane alighting area is reported in Shimabara-kaiwan near the mouth of Ōmuta-gawa.

**(4) Billeting facilities.**

There are about 10 schools scattered through the area (FIGURE VIII-89).

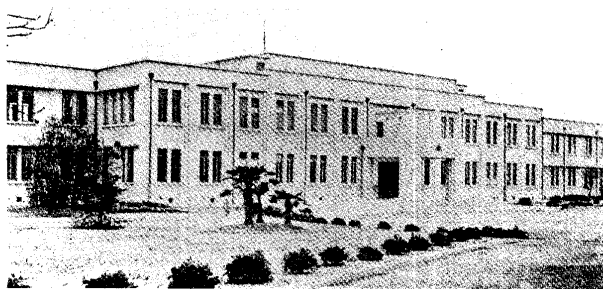


FIGURE VIII - 89. Ōmuta-Miike.  
Mitsui Technical School. 1937.

**(5) Buildings.**

The leading industrial buildings are:

Mitsui Zinc Refinery (2 plants).	Cotton spinning mill.
Oriental High Pressure Company (2 plants).	Miike Machinery Works.
Mitsue Coal liquefaction plant.	Sulphuric acid plant.
Miike Dyestuffs plant.	Electro-chemical plant.

Other buildings include the Ōmuta municipal office, a large prison, the Mitsui Club, and several post offices.

**(6) Internal transportation.**

A street car line connects the port area with the center of Ōmuta. The railroad belt line describes a semicircle from industrial plants north of the mouth of Ōmuta-kawa to Miike-kō; it serves the factory concentration in the northeastern part of the city and outlying coal mines to the south.

**(7) Repair and service facilities.**

The industrial plants have machine shops for making and repairing special equipment.

**(8) Public utilities.**

(a) *Water.* The water system, supplied mainly by 3 deep wells, furnished a daily average of 12,400 cubic meters in 1936; 750 dug wells constituted an additional supply. Two reservoirs are located south of Miike-kō.

(b) *Power.* Three steam plants using Miike coal are leading suppliers of the West Kyūshū grid. The Minato plant, located at Miike-ko between the inner and outer basins, generates 162,000 kilowatts and is the second largest generating station in Kyūshū.

**(9) Warehouses and storage.**

Two large coal yards border Miike-kō; several chemical plants have tanks storing liquid fuels and industrial gases. It is probable that warehouse space is available at various industrial plants.

**(10) Health and sanitation facilities.**

At least 7 hospitals are located in Ōmuta.

**(11) Vulnerable points.**

The following are some of the vulnerable points: harbor installations, especially the sea locks between the inner and

outer basins; power plants; and railroad yards and junctions of the belt line and main railroad.

**F. Kumamoto (1940 population: 210,038).**

**(1) Importance.**

Kumamoto (FIGURES VIII-90 and VIII-91) is the fourth largest city in Kyūshū and one of the largest inland cities in Japan. It is primarily a government center, as the capital of Kumamoto prefecture, and the headquarters of the 6th Army Division. It is also the commercial center for the lowland east of Shimabara-kaiwan (gulf), but has little industrial importance.

**(2) Physical characteristics.**

The city is on the western side of the island, about halfway between Moji in the north and Kagoshima in the south; it is 5 miles east of Shimabara-kaiwan on Shira-kawa (river). The plain surrounding the city extends inland to the margins of Aso-zan, the great volcano dominating central Kyūshū.

The main part of the city, including the castle grounds on the western margin, is shaped like a right triangle, with a north-south base and a hypotenuse along Shira-kawa (FIGURE VIII-90); there are projections along main roads across Shira-kawa and to the north. The urban area extends 2 miles north and south and 1½ miles east and west. The most heavily built-up area is a strip ¼ mile to ½ mile wide bordering the Shira-kawa on the northwest. Streets run generally north-south and east-west except along the river and east of it. There is no marked differentiation of commercial, industrial, and residential areas. Most of the government buildings are between the castle grounds and Shira-kawa, and the military buildings are within the castle grounds and on the eastern margin of the city.

**(3) Means of access.**

(a) *Rail.* A cross-island line from Ōita meets the main line from Moji to Kagoshima at Kumamoto. Short branches reach Tamachi, 18 miles southeast, and Misumi, 20 miles southwest. The Kumamoto and Kami-Kumamoto railroad stations are in the southwestern and northwestern parts of the city respectively. Three electric train lines reach Kumamoto from Kawashiri, 4 miles south, Hyakkangoku, 4 miles west on the coast, and Waifu, 14 miles northeast.

(b) *Road.* National highways from Kurume and Saga and a secondary road from Ōmuta unite just north of the city. The National Highway continues south to Kagoshima, and secondary roads lead through the mountains to the east coast of the island at Nobeoka and Ōita.

(c) *Air.* A civil airfield is located about 3 miles south of the city.

**(4) Billeting facilities.**

A large force could be billeted in the permanent garrison buildings, which are located in the 6th Army Division headquarters area in the castle grounds, and the 6th Cavalry Regiment, 6th Artillery Regiment, and 13th Infantry Regiment areas on the eastern margin of the city. Additional facilities are available in the Kumamoto Medical College, the schools (FIGURE VIII-92), and the government buildings.



FIGURE VIII-91. *Kumamoto.*  
Airview of southern portion of city. Looking E from Hanaoko-yama.

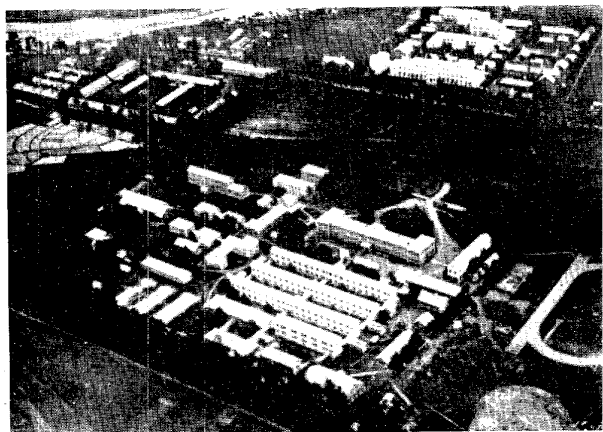


FIGURE VIII-92. *Kumamoto.*  
Airview of large schools in northern part of city. Looking S.  
5th Higher School in foreground; technical schools in background near Shira-kawa.

**(5) Internal transportation.**

Street car lines, supplemented by the interurban lines previously noted, serve all important parts of the city.

**(6) Public utilities.**

(a) *Water.* The main source of the city water system, a reservoir near Aso-zan (mountain), was supplemented by 10,428 wells; a daily average of 14,400 cubic meters was furnished in 1936.

(b) *Power.* Kumamoto is supplied with electric power from the West Kyūshū grid.

**(7) Health and sanitation facilities.**

A large hospital is operated in connection with Kumamoto Medical College. A 1938 report lists 1 hospital with 78 beds, 1 convalescent home with 6 beds, and 2 clinics. A pharmaceutical school is located ½ mile east of the medical college.

A public sewerage system with closed pipes serves the city.

## 87. *Southern Shikoku and Southeastern Kyūshū*

### A. Introduction.

Southern Shikoku and southeastern Kyūshū are similar to Sanindō in that they are hilly and contain few large plains; there are, consequently, relatively few settlements, either urban or rural. None of the cities is located directly on the Pacific; Kagoshima is at the head of the long Kagoshima-wan; Ōita and Beppu are on Beppu-wan well inside the passageway to the Inland Sea; Tokushima lies on the well-protected eastern entrance to the Inland Sea; and even Kōchi, which is at the head of the rather open Tosa-wan, actually lies several miles inland. Southeastern Kyūshū has only 1 important inland town, Miyakonojō, while Shikoku has several, such as Ikeda, at the head of the rift valley of Yoshino-gawa, and Awa-ikeo, a railway junction.

Most of the cities and towns of this area are of minor importance. They serve as commercial centers for restricted hinterlands, trade in local agricultural produce, manufacture goods for local consumption, fish, and, in some cases, cater to tourists. Most of the cities and towns are classified as diversified, but Ōita is a government center and Beppu is a trade and tourist center. Among the smaller towns, Nobeoka is of strategic importance because of the concentration of factories for the production of rayon, heavy chemicals, and explosives. Sacki is the site of a naval base.

### B. Kagoshima (1940 population: 181,736).

#### (1) Importance.

Kagoshima is the major port and city of southern Kyūshū, and the capital of the prefecture of Kagoshima. Agricultural products, especially citrus fruits, are shipped to other parts of Japan and to the south seas. Kagoshima is also noted for the manufacture of fine porcelain and as a tourist center for the famous volcano of Sakura-shima.

It has recently come to have strategic importance because of the location of oil tanks, and factories producing explosives and submarines. The important naval base, Kanoya, is located

22 miles southeast of the city, on the eastern side of Kagoshima-wan. It has an auxiliary airport, a wireless station, and a power plant.

*(2) Physical characteristics.*

Kagoshima is situated in the southern portion of Kyūshū near the head of, and on the west side of Kagoshima-wan, due west of the famous volcano of Sakura-shima.

The city is located on the small delta plain of Kōtsuki-gawa, which flows through the heart of the town, and is sharply hemmed in by foothills of the adjacent mountains (FIGURES VIII-93 and VIII-94). The northern part of the city has a single dominant topographic feature, a dissected hill 360 feet high, pierced by a railroad tunnel approximately  $\frac{1}{4}$  mile long.

The city plan is roughly elliptical; its long (north-south) axis extends 3.25 miles, and its east-west axis approximately 1.25 miles. The city is much wider in its northern than in its southern part. The main business district apparently lies north of the river adjacent to the harbor. The residential section is in the southern part, while industrial sites are found close to the railroad on the outskirts.

The street plan (FIGURE VIII-95) is that of a series of rectangular grids, the streets having different orientations in different sections.

The chief open spaces are along the waterfront and in the northwestern portion up the Kotsuki valley. The most prominent open spaces within the city proper are school and temple grounds.

*(3) Means of access.*

*(a) Water.* Kagoshima is easily accessible by water, as vessels of fairly deep draft can come alongside the pier. There is berth for a vessel of 3,000 tons and of 24-foot draft. Larger vessels are accommodated in the anchorage. This port is connected by steamer with Kōbe and Ōsaka, and with Tanegashima, Yaku-shima, Ryūkyū-retō (islands).

*(b) Rail.* A single-track railroad system connects Kagoshima with the main cities and towns of the island.

*(c) Road.* One primary road runs westward to coastal towns and another around the head of the gulf to the east coast. A secondary road runs southward to the southwest tip of Kyūshū.

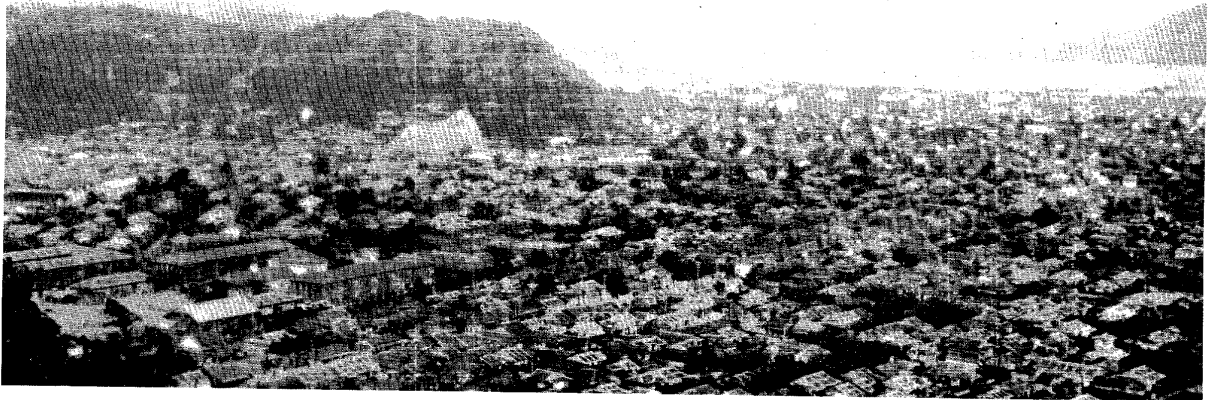


FIGURE VIII-93. *Kagoshima.*

View of city from Shiro-yama. Looking NE toward upper part of Kagoshima bay. Matsu-minzan hill with tomb of Saigo (left center); railroad, central line from right to left; 7th High School (left center); prefectural office (upper right, near bay).



FIGURE VIII-94. *Kagoshima.*

View of city from Shiro-yama. Looking E toward Sakura-jima volcano. Railroad line and station (lower center); headquarters of 36th Brigade (lower right); Osuri peninsula in background.

(d) *Air.* There is a fighter landing ground  $1\frac{1}{4}$  miles south-southeast of Kagoshima and a seaplane base  $1\frac{1}{2}$  miles south-southeast.

**(4) *Billeting facilities.***

The barracks on the outskirts of the city, about  $1\frac{1}{2}$  miles up the Kōtsuki valley, doubtless offer the best facilities. The 4 inns (Meijiya, Satsumaya, Yamashiroya, and Satsumayabesso) and many schools afford some billeting space.

**(5) *Buildings.***

Important structures are the prefectural and municipal buildings, the customs house, and the power plants.

**(6) *Internal transportation.***

An electric railway enters the city from the suburbs to the south, runs through the center of the city, and connects with the main railroad and the port area.

**(7) *Repair and service facilities.***

Machinery factories and repair shops have been developed in Kagoshima in recent years. The principal plant is a tool and machinery factory located at the junction of the railroads near the western edge of the city. Railroad repair shops are also located here.

**(8) *Public utilities.***

(a) *Water.* There is a reservoir in the foothills about  $\frac{1}{2}$  mile north of the city. In 1936, 46% of the houses and 49% of the population had water supply. The average consumption was 7.8 cubic meters. There were 8,817 wells in all.

(b) *Power.* At least 4 power plants are in the city, 2 near the river, a third just south of the railway junction, and a fourth on the extreme northern outskirts. Kagoshima is connected with the Kyūshū power grid system.

(c) *Gas.* City gas works and storage tanks are located on the waterfront approximately  $\frac{1}{4}$  mile north of the mouth of Kōtsuki-gawa. The annual volume of gas used in Kagoshima is 1,961,000 cubic feet.

(d) *Communications.* There is telephone and telegraph communication with the rest of Japan. There is a submarine cable connection between Kagoshima and Tansui via Ryūkyūrettō, and with Yap via Okinawa-shima. There are 3 wireless stations, one in the southern section south of the river, a second near the river in the central part of the city, and a third in the northern part. Radio towers are located on the flat just south of and at the mouth of Kōtsuki-gawa.

**(9) *Warehouses and storage.***

Warehouses are undoubtedly located along the quay and docks. Oil tanks are located in Kagoshima and on nearby Sakura-shima.

**(10) *Health and sanitation facilities.***

Kagoshima has 5 public hospitals. The 2 most important are the Red Cross hospital, located on the coast at the southern edge of the city, and a military hospital.

There is a sewerage system.

Filariasis (vector, *Culex fatigans*) is common. The entire area is subject to dengue and schistosomiasis.

**(11) *Vulnerable points.***

Railroad tunnel.

Railroad junction and shops.

Submarine dock (position unknown).

**C. Kōchi (1940 population: 106,644).**

**(1) *Importance.***

Kōchi is the capital of a prefecture and the principal commercial center of southern Shikoku. It is the center of the area in which 2 crops of rice are grown annually, and of a specialized area of paper making.

**(2) *Physical characteristics.***

Kōchi is situated on the south side of the island of Shikoku at the head of Urado-wan, which is an arm of Tosa-wan, and approximately 5 miles inland from the open sea.

The city is located on a delta plain (FIGURE VIII-96) on the north side of Kagami-gawa. The plain here is somewhat constricted by spurs from the mountains, which nearly everywhere in Shikoku come close to the coast (FIGURE VIII-97). One of these spurs, in the form of a narrow sinuous ridge, extends east and west, forming a constriction at the lower end of the river; the river has cut through it, however, providing a narrow bottle-neck entrance to the inner harbor. An important topographical feature of this site is a roughly elliptical hill, 390 feet in elevation, about  $\frac{1}{4}$  mile south of the Kagami-gawa and  $\frac{1}{2}$  mile west of the electric railway line.

The city has an east-west extent of about 3 miles and a north-south extent of 1 mile near its central portion, just east of Castle park. East and west from this point, the city narrows down to less than  $\frac{1}{2}$  mile. A much smaller portion of the city extends south of the river and this development is scattered and given over to industrial plants. North of the river the city is compact, especially to the east of Castle park.

The business district is in the eastern portion of the city and the residential district is in the less congested portion surrounding Castle park (FIGURE VIII-98). A third district, south of the river, includes buildings related to the port and some industrial plants. On the periphery are small suburbs and villages.

The street plan (FIGURE VIII-99) is that of a grid with orientation of the main streets and "squares" conforming to the course of the river. These rectangular blocks differ considerably in size and shape; they are smaller and more regular in the eastern part of the town, and larger and more irregular in the western part.

The chief open spaces are principally in the peripheral areas; there are very few within the city itself.

Streets are mostly narrow and unpaved, but one of the principal streets, skirting the castle grounds, is broad and borders a canal or distributary which has several wide bridges. Other streets with double-track electric lines have wide roadways for vehicles on either side. These streets appear to be paved or at least hard surfaced.

**(3) *Means of access.***

(a) *Water.* Access to Kōchi by water is through the narrow channel at the lower end of Urado-wan, which has been dredged to a depth of 18 feet.

(b) *Rail.* Kōchi is connected by rail with all the principal towns of the island, across the island via Tsuji and eastward along the main valley to Tokushima, and with Takamatsu on the north coast.



FIGURE VIII - 95. *Kagoshima*.

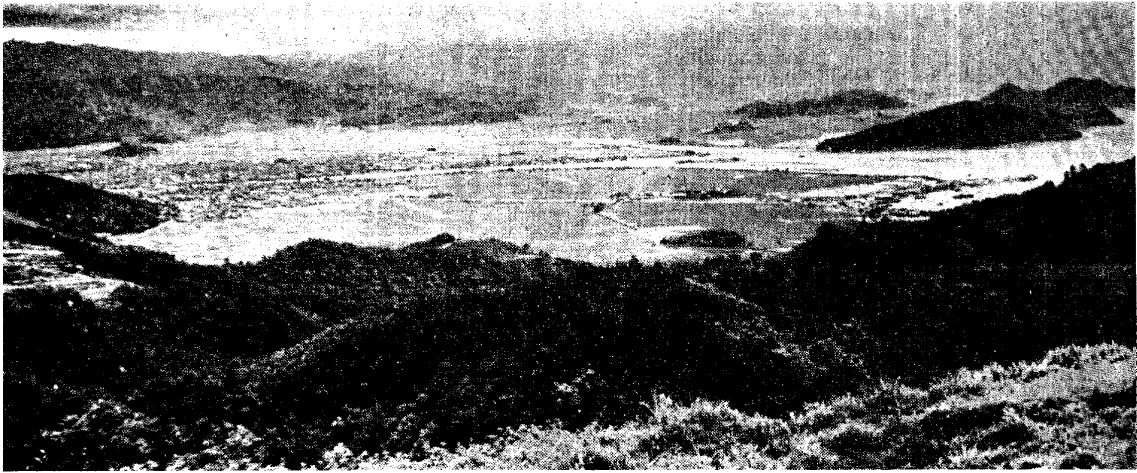


FIGURE VIII - 96. *Kōchi*.  
General view of the delta plain site of Kōchi. Looking NE.

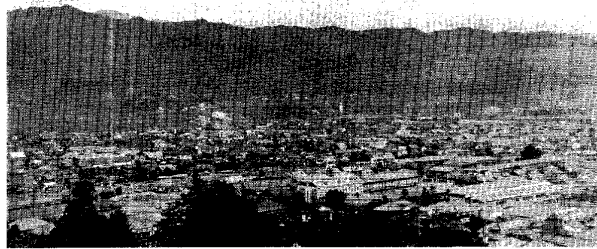


FIGURE VIII - 97. *Kōchi*.  
View of city and adjacent mountains. Looking E from castle. 1927.



FIGURE VIII - 98. *Kōchi*.  
View of the central part of city. Looking E. Castle park in background; prefectural offices in left center; municipal office; prefectural offices. 1930.

(c) *Road.* A primary road parallels the railroad across the island and another follows the coast eastward to Tokushima. Secondary roads lead out to villages in the mountainous interior.

(d) *Air.* A civil landing field, reported to comprise 300 acres, is located about 3 miles south of the city, and a seaplane anchorage is just outside the inner harbor at the head of Urado-wan. The Japan Airways Company operated lines from Ōsaka to Kōchi.

#### (4) *Billeting facilities.*

The principal billeting facilities are the infantry barracks. One infantry regiment was stationed here in 1941.

Six large and 4 small workers' dormitories of unknown capacity are located in the space between the 2 power plants on the south embankment of Kōchi-kō (FIGURE VIII-99).

The various schools and the small inns could provide additional space. One large school building is located about ½ mile south of the central part of the city.

#### (5) *Buildings.*

The following buildings are important: a silk mill and a paper mill at the west end of the city near the railroad; 2 power plants with several buildings, located on the south side of Kōchi-kō; a cement plant, with 20 or more structures including dormitories, in the same area. Numerous warehouses and other buildings line the banks of both streams. Governmental buildings cluster around an open square about 1 block northeast of the north end of Zakoba bridge. A market building is located on the northeast corner of the square just south of the infantry barracks.

The most conspicuous building is the castle, within the wooded park near the center of the town, on a hill 141 feet in elevation.

#### (6) *Internal transportation.*

An electric railway consists of 2 main branches; one connects the harbor with the center of the city and the other runs in an east-west direction. The latter crosses the Kokuba-gawa and serves the settlements on the east side of that stream. The car line circles about 11 city squares, facilitating transportation to the 4 sections of the city.

In addition to 2 railway bridges, 3 other bridges cross Kagami-gawa and two cross Kuniwakatsu-gawa.

#### (7) *Repair and service facilities.*

The railroad yards and the industrial plants have repair facilities.

#### (8) *Public utilities.*

(a) *Water.* Kōchi has 2 reservoirs with a combined capacity of 2,774,000 gallons, serving 80,000 people. The water comes from Kagami-gawa (river) and is filtered.

(b) *Power.* This city is connected with the Shikoku power grid.

(c) *Gas.* Kōchi annually consumes 1,046,000 cubic feet of gas.

#### (9) *Warehouses and storage.*

Numerous warehouses and storage sheds are found near the docks and the various industrial plants.

Kōchi has 1 tank for gasoline (Socony-Vacuum Oil Com-

pany), 2 tanks for diesel oil, and 2 for kerosene (Rising Sun Petroleum Company).

#### (10) *Health and sanitation facilities.*

Kōchi is reported to have 1 municipal hospital with 96 beds, 3 doctors, 6 nurses, and 1 pharmacist. Filariasis, malaria, dengue, and plague are common in this area.

#### (11) *Vulnerable points.*

Important targets are: the chemical plants and power plants south of Kagami-gawa, the 2 railway bridges, and the port-works.

### D. Tokushima (1940 population: 119,581).

#### (1) *Importance.*

Tokushima faces Kōbe (51 miles distant) and Ōsaka and is the largest city on the island of Shikoku. It is the capital of Tokushima prefecture and is well known for the manufacture of high-quality cotton crepe.

The city lies at the eastern end of the largest alluvial area of the island and is, in consequence, a commercial center for an important agricultural hinterland.

#### (2) *Physical characteristics.*

Tokushima is situated near the extreme northeast corner of Shikoku, close to the eastern entrance to the Inland Sea.

The city lies at the lower end of the long east-west rift valley of Yoshino-gawa (river) on Shimmachi-kawa, a distributary south of that stream. It is a delta plain settlement (FIGURE VIII-100). A flood control project on Yoshino-gawa reflects the low site of this city. The eastern part of the town is spread out on the river flats, but the western part wraps snugly around a spur from the mountains to the southwest. The lower part of the town and environs are cut up by canals and distributaries of the Shimmachi-kawa. Tokushima, in its shape and pattern, is largely controlled by the mountain spur which it hugs and by the courses of the distributaries along whose banks it is built. Its greatest east-west length is approximately 3 miles and its width north and south about 1½ miles. Tokushima is compact in the western portion, where it is crowded against the hills, but settlement is less dense in its eastern part.

The central part of the city is given over to business structures; substantial residences and schools are located in the outskirts.

Although there is a rectangular street pattern, street orientation is irregular and streets change direction within short spaces. Open spaces within the city proper are few, but in the eastern part there are extensive flats which, though they may be flooded in certain seasons, provide open space. Parks, temple grounds, and school yards augment this space.

#### (3) *Means of access.*

(a) *Water.* Tokushima is about 1¼ miles from Tokushima-kō, the harbor of which is accessible only to small boats. Its port is Komatsushima, 3½ miles to the south. About 300 lighters are used to land cargo from the open sea.

(b) *Rail.* A railroad connects Tokushima with Takamatsu to the northwest, Kōchi to the southwest, and Iiwasa to the south.

(c) *Road.* A first-class road connects this city with some





FIGURE VIII - 100. Tokushima.

Airview of city. Looking NE. Center of city (left); railroad station (center); Shimmachi-kawa (left); Shimmachi-bashi (bridge) (on left first from bottom). 1930.

of the coastal cities, but only a second-class road connects with Ikeda, at the head of the Yoshino valley, and Takamatsu.

(d) *Air*. There is a fighter landing field  $1\frac{3}{4}$  miles north-east of Tokushima and Tokushima-Muya road on the parade ground just south of Yoshino-gawa. It is the base of Tokushima Naval Air Unit and the branch depot for the Osaka-Kōchi airline.

#### (4) *Billeting facilities.*

In 1941, this city was headquarters of one infantry brigade and one infantry regiment, the barracks for which are located in extreme western outskirts between the railway and the foothills.

There are at least 3 schools and, in 1933, there were 3 inns, the Shinagen, the Hirakamero, and the Tsurukamero.

#### (5) *Buildings.*

On an old castle site in Tokushima park, just northeast of the railway, and in the north central part of the city are 2 halls, a memorial monument, a commercial museum, a zoological garden and a municipal library. The provincial and municipal buildings are located in the center of the city, the former just west of the railway, and the latter just to the east of it. Several schools are located in the northern part of the town near Shimmachi-kawa.

#### (6) *Internal transportation.*

Many canals and distributaries of the river, bridged at numerous places, cut through the city.

#### (7) *Public utilities.*

(a) *Water*. Yoshino-gawa is the source of Tokushima's

water, which is filtered and stored in 2 reservoirs serving 80,000 people.

(b) *Power*. Tokushima is connected with the Shikoku power grid system.

(c) *Gas*. Tokushima has an annual gas consumption of 241,000 cubic feet.

(d) *Communications*. Tokushima is connected with the telephone network of Japan. There is a submarine cable from Muya to the island of Awaji, 7 air miles to the northeast. There is a radio station in Tokushima.

#### (8) *Health and sanitation facilities.*

Plague has been reported for Tokushima. The city has 1 municipal hospital with 68 beds, 14 doctors, 18 nurses, and 4 pharmacists.

#### (9) *Vulnerable points.*

The following are the more important targets:

1. The railroad bridge over the Shimmachi-gawa.
2. The military headquarters in the extreme western outskirts.
3. The port installations at Komatsushima.

#### E. Miyakonojō (1940 population: 58,819).

Miyakonojō is a railroad hub and the center of the Miyakonojō basin, which has a large rural population. It is about 16 miles inland and north of Ariake-wan (bay), in southeast Kyūshū, in a broad intermountain valley on the upper reaches of Iwase-gawa (river) near its confluence with several tributaries. The city can be reached by rail and highway from Shibushi, Kagoshima, and Miyazaki. A civil and an army airfield are located  $1\frac{1}{4}$  miles northwest of the city.



FIGURE VIII - 101. Nobeoka.

General view of city and Asahi Benberg Kenshoku K. K. silk plant. Looking NE. 1937.

Miyakonojō has barracks for 1 infantry regiment, at least 4 factories and 2 steam plants, and a third steam plant about 8 miles northwest of the city. Vulnerable points include the army airfield and the garrison.

#### F. Miyazaki (1940 population: 66,497).

Miyazaki, the center of an agricultural region (FIGURE VII-14, lies on the southeast coast of Kyūshū, occupying a narrow strip of poorly drained new alluvium on the north bank of Oyodo-gawa, about 2 miles from the sea. Small coasting steamers and sailing boats can enter the harbor. Miyazaki is connected by rail and highway with the main towns of Kyūshū. A fighter airfield is just west of the city, and there is an emergency field 2½ miles to the northwest.

The city has a radio station and a piped sewerage system. A railroad bridge spans Oyodo-gawa.

#### G. Nobeoka (1940 population: 79,426).

Nobeoka, about halfway up the east coast of Kyūshū, is of strategic importance because of its output of rayon, heavy chemicals, and explosives (FIGURE VIII-101). The city is on a delta plain on both banks of Gokase-gawa, just above the confluence of Gokase-gawa and Hori-gawa, and about 1½ miles from the sea. It is partly flanked by mountains. Nobeoka is accessible from the sea probably only by coastal vessels. It has rail and highway connections with other east coast cities, to both the north and south. A seaplane alighting area is reported, probably at the mouth of Gokase-gawa.

Nobeoka's most important buildings are its factories and chemical plants (FIGURE VIII-101). The city is connected with the east Kyūshū power grid, and also has 2 steam plants and 2 other plants, possibly hydroelectric, on Gokase-gawa. Vulnerable points include a powder magazine northeast of the city, 2 explosives plants, chemical plants within the city, and a railroad bridge.

#### H. Saeki (1940 population: 32,505).

Saeki, a naval air base, is at the head of Saeki-wan, near the easternmost point of Kyūshū, and commanding Bungo-suidō (channel). It is situated on a wide delta plain on the north bank of Bansho-gawa, cut through by numerous channels and distributaries. Shiro-yama (elevation 527 feet) is about ¼ mile west of the city.

Saeki is easily accessible from the sea, and has anchorage for naval vessels off the mouth of the north channel of the river. It is connected by rail and highway with all the important coastal towns of Kyūshū. There is a naval air station 1¼ miles northeast of the city.

The principal buildings in the city are those of the cement plant. At the naval base, 1 mile northeast of Saeki, there are 4 large land plane hangars, 3 seaplane hangars, shops, and barracks, all built of concrete.

Canals provide internal transportation facilities in the eastern part of the city.

Saeki's chief vulnerable points are the naval station and the Nippon Cement plant.

#### I. Ōita (1940 population: 76,985).

Ōita, a government center, is the largest city on the Inland Sea coast of Kyūshū, a distribution center for both rail- and water-borne commerce, and the site of varied industries, principally textiles.

Ōita is on a delta plain on the southern shore of Bepu-wan (bay), bounded by low hills to the west and south and by Ōita-gawa (river) to the east. The triangular built-up portion is bounded by the coastal rail line, the Ōita-gawa, and the seas. The business district is located in the center of the built-up area; factories are scattered throughout the city.

Ōita's artificial harbor is protected by breakwaters (FIGURE VIII-102). Railroad lines from Kurume, Kumamoto, Moji,



FIGURE VIII-102. Ōita.

Harbor and western portion of city. Looking N. 1935.

1. Breakwater.
2. Harbor.
3. Harbor lights.
4. Beppu-wan.
5. Kasuga Garden.

6. Kasuga Jinsha.
7. Junction of railroad line of Daito; Bungo-Mori and Hōhi railroad lines.
8. Direction of the main railroad station.

and Kagoshima join at Ōita. The main railroad station, a large railroad yard, and a roundhouse are located south of the business center. A railroad bridge east of the railroad yard crosses the Ōita-gawa. Ōita is connected by an electric rail line with Beppu, and is on the main coastal road from Kokura to Nobeoka, and on a secondary road from Sagamosaki to Hida. There is an airfield on the coast, just east of Ōita-gawa.

Billeting facilities are available in the barracks of the 47th Infantry and at the airfield; in the dormitories of the silk-reeling mills, the cotton-spinning mills, the artificial wool factory, and the Fuji Gas Spinning Company; and in at least 15 schools. Other buildings include the educational building; the prefectural office; the post, telegraph, and telephone office; the city hall; the bank (opposite the post office); the Tokiwa department store; the paper mills (near the railroad bridge crossing the river); the fertilizer company (south of the main railroad station); and the tin refinery (on the east shore of the harbor).

An electric rail line from Beppu runs along the shoreline to the eastern part of the city, and then south into the business district. Two small streams and the shallow Ōita-gawa are probably used for transportation. Water is obtained from the Ōita-gawa; 2 reservoirs provide 20 gallons daily per capita. Power is supplied by 2 power stations, one near the Fuji Gas Spinning Company, and the other south of the railroad station. A power line to Beppu follows the inland valleys. The Electric Company is located on the electric railroad line north of the business section. Ōita has 2 radio stations, and at least 2 hospitals, one of which is attached to the 47th Infantry headquarters. Sewage is removed by a new piped system.

#### J. Beppu (1940 population: 64,724).

Beppu is a resort center, and was, in 1929, the only municipal hot springs area in Japan. Six other important spas are nearby. Beppu is on the southern shore of the Inland Sea, on an inlet of Bungo-suidō (FIGURES VIII-103 and VIII-104). It is bounded by hills on 3 sides, with Beppu-wan (bay) to the east.



FIGURE VIII-103. Beppu.

City and harbor. Looking NW. 1930.

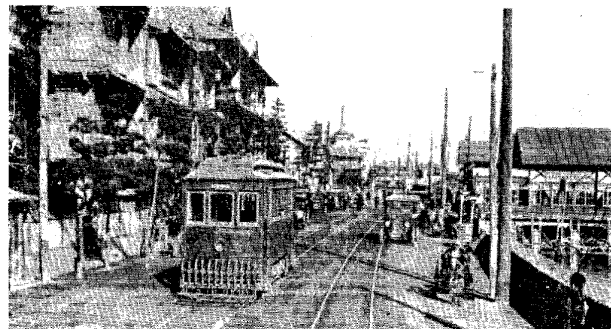


FIGURE VIII-104. Beppu.

View of street along waterfront. 1930.

The city is scattered over an area 3 miles north-south and 5 miles east-west.

The dock can probably accommodate 6,000-ton vessels. The Japanese Imperial Navy, including 68 vessels, has anchored offshore on the bay. Beppu is on the Kokura-Ōita-Yoshimatsu rail line and the local Ōita-Beppu electric line. A first class concrete highway runs to Kokura and Nobeoka. There is a



military airfield to the northwest, and a seaplane anchorage in the harbor. Three-hour air service to Ōsaka and 1-hour service to Pusan is maintained.

Billeting space is available in more than 300 hotels and inns. Other buildings include the Geophysical Laboratory, the steam plant of Fuji Gasu Doseki, the Oligi Fertilizer Company, and the Prefectural Products Museum. Water is supplied from the Ōita Prefectural Plant. There are numerous medical facilities for convalescents, as well as a naval hospital and the Furosen Public Bath House. In 1928, there were 1,369 hotspring vents, 800 of which were used for bathing and 400 for household use.

## 88. Glossary

<i>bouchi</i>	basin
<i>gawa (kawa)</i>	river
<i>hantō</i>	peninsula
<i>heiya</i>	plain
<i>kai</i>	bay, gulf, sea
<i>kaikyō</i>	strait, channel
<i>kaizan</i>	gulf, bay
<i>ko</i>	lake
<i>kō</i>	harbor
<i>nada</i>	open bay, gulf, sea
<i>Sanindō</i>	the northern coast of southwest Honshū
<i>Sanyō</i>	railroad from Kōbe to Shimonoseki
<i>Seto-naiki</i>	Inland Sea
<i>shi</i>	a chartered municipality
<i>shima (jima)</i>	island
<i>suidō</i>	channel
<i>Tōkaidō</i>	railroad from Tōkyō to Kōbe; highway from Tōkyō to Kyōtō
<i>umi</i>	sea, bay, gulf
<i>wan</i>	bay, gulf
<i>yama</i>	mountain, hill
<i>san (san)</i>	mountain, hill

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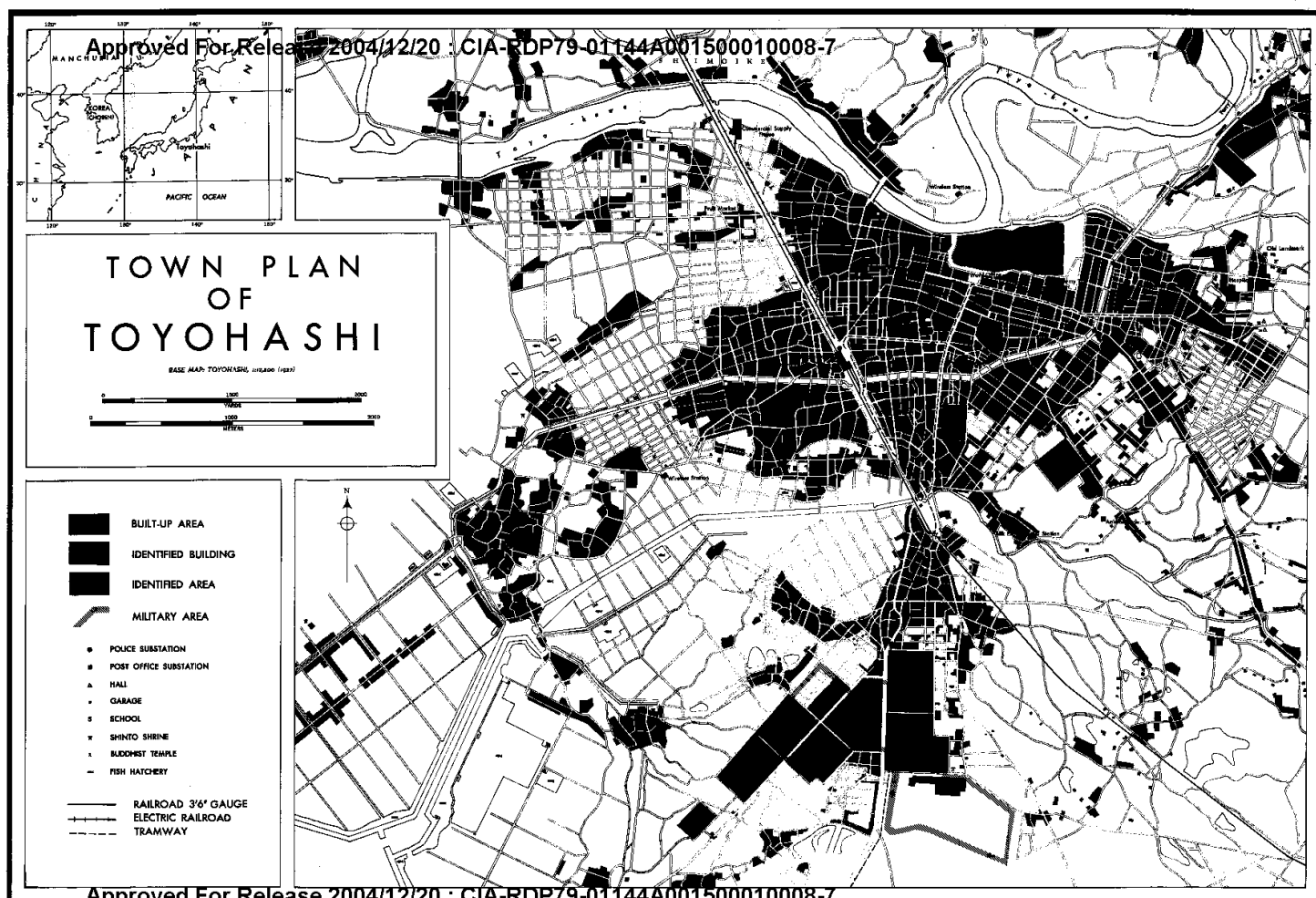
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1943. 90.28 Kochi Area.  
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1943. 90.31 Bungo Area.  
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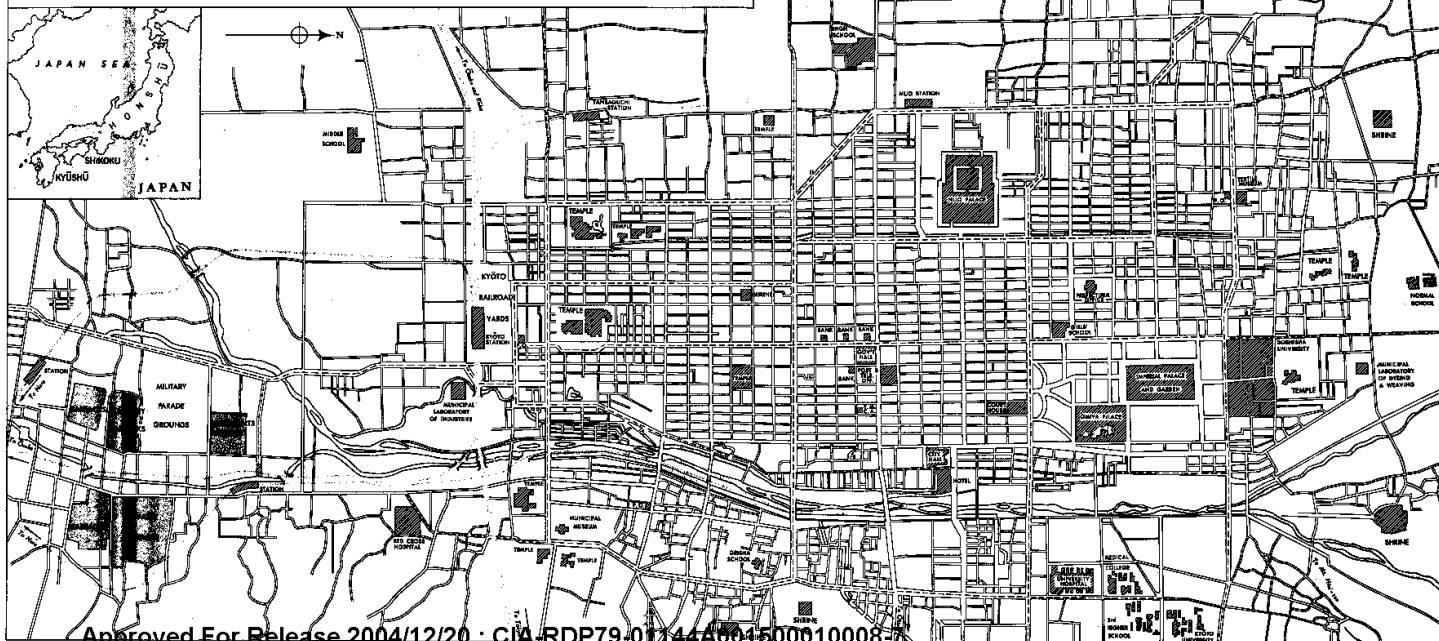
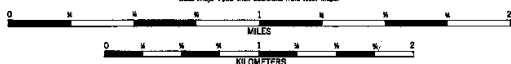


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# TOWN PLAN OF KYŌTO

- |  |                     |
|--|---------------------|
| — · — · — Railroad 3'6" Gauge Single             | - - - - - Tramway   |
| — · — · — Electrified Railroad 3'6" Gauge Single | - - - - - Subway    |
| — · — · — Electrified Railroad 3'6" Gauge Double | ■ Military Building |
| — · — · — Electrified Railroad 4'8" Gauge Double | ■ Other Building    |

Base Map 1952 with additions from later maps.

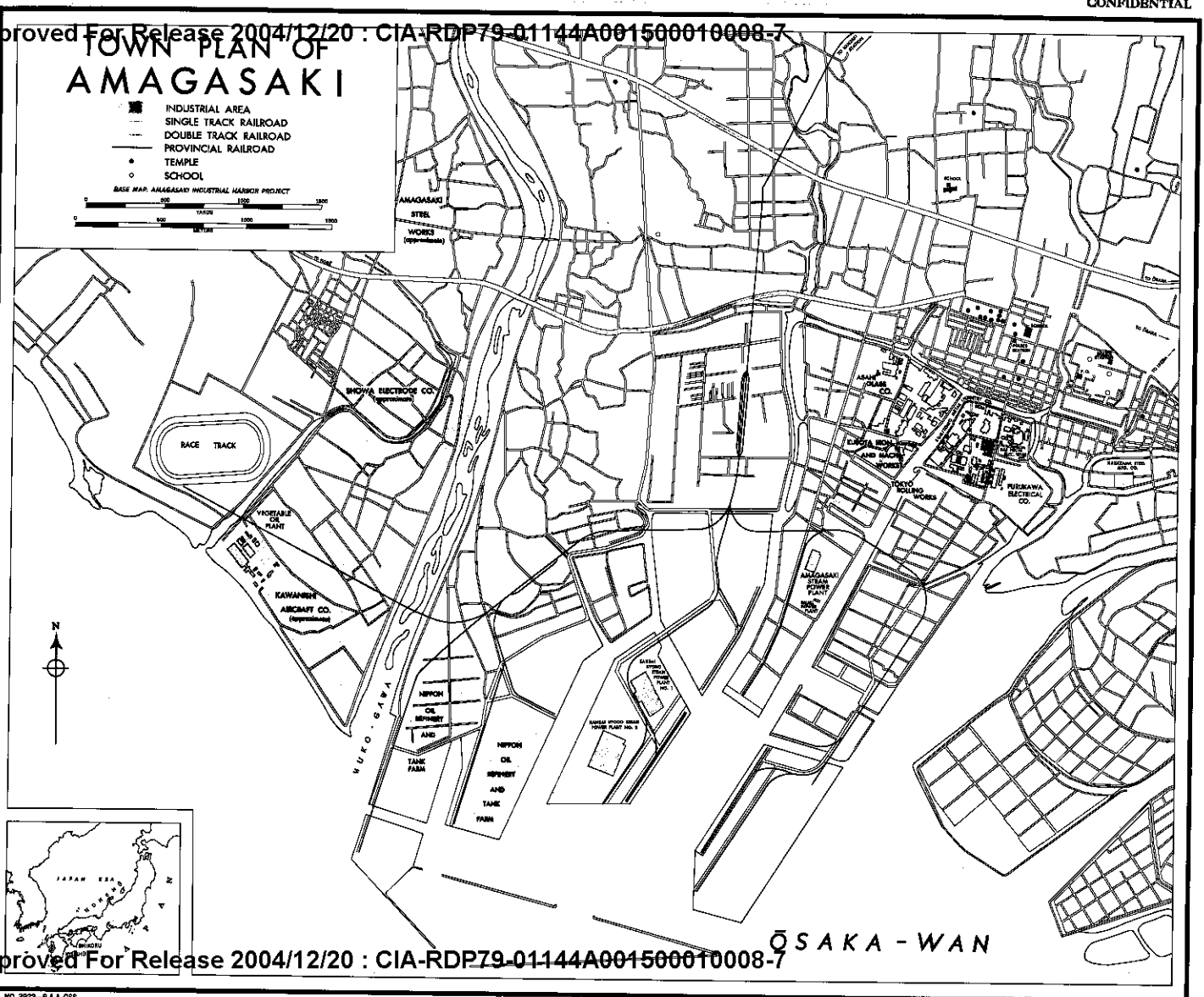


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FIGURE VIII - 37  
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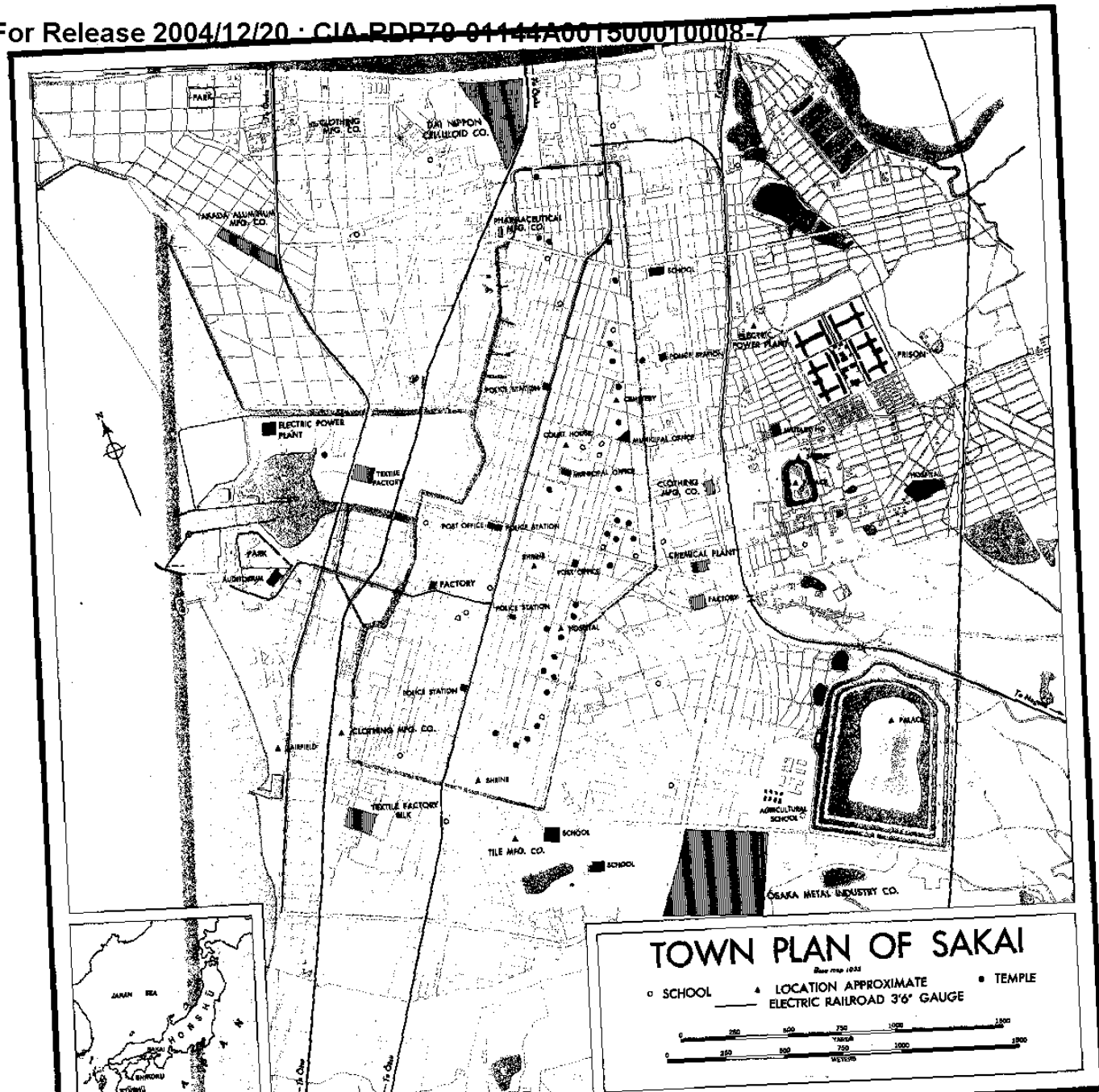
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FIGURE VIII - 35  
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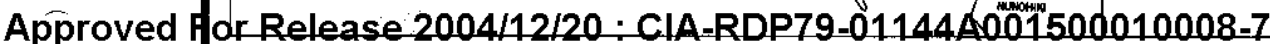
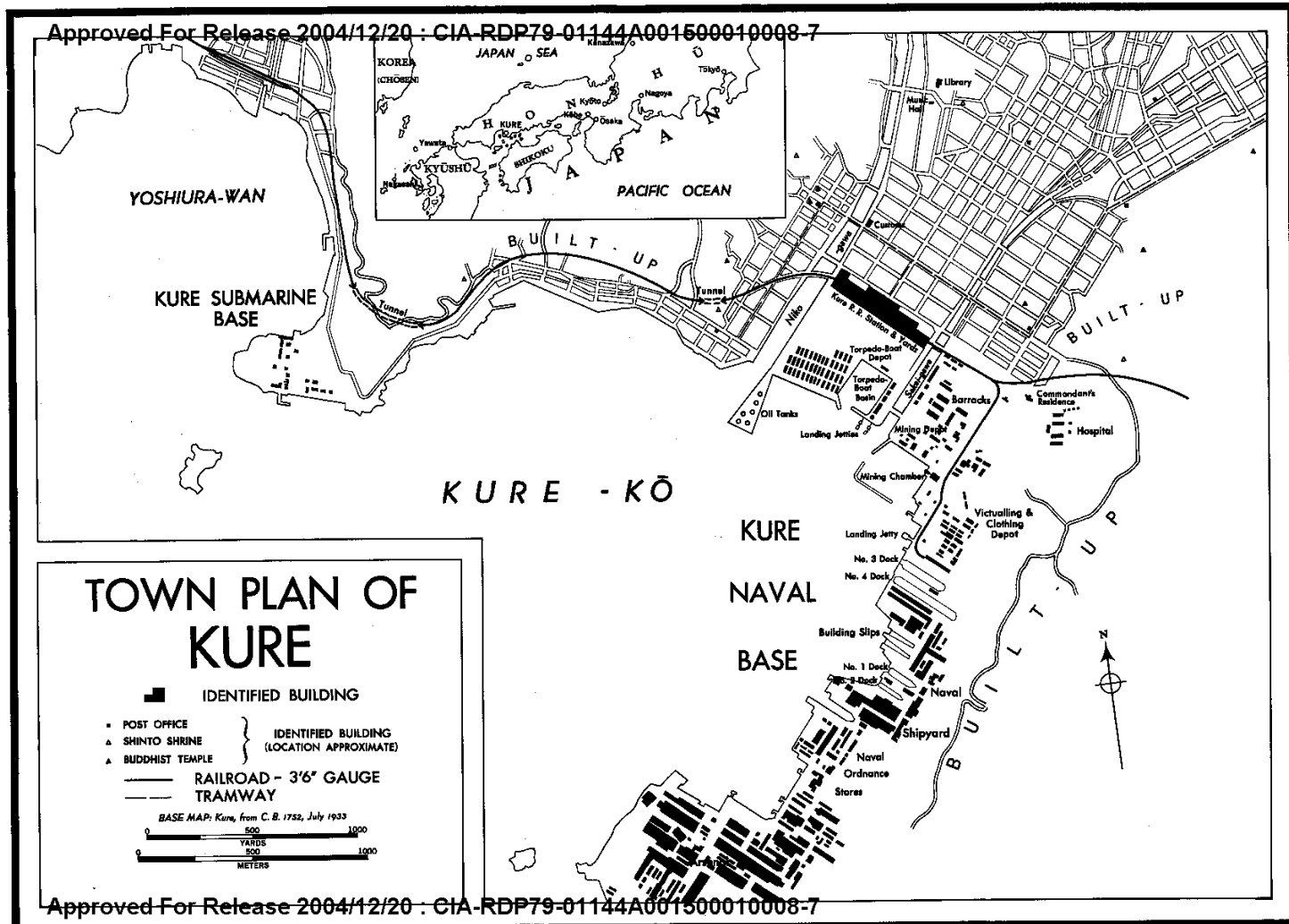


FIGURE VIII-40  
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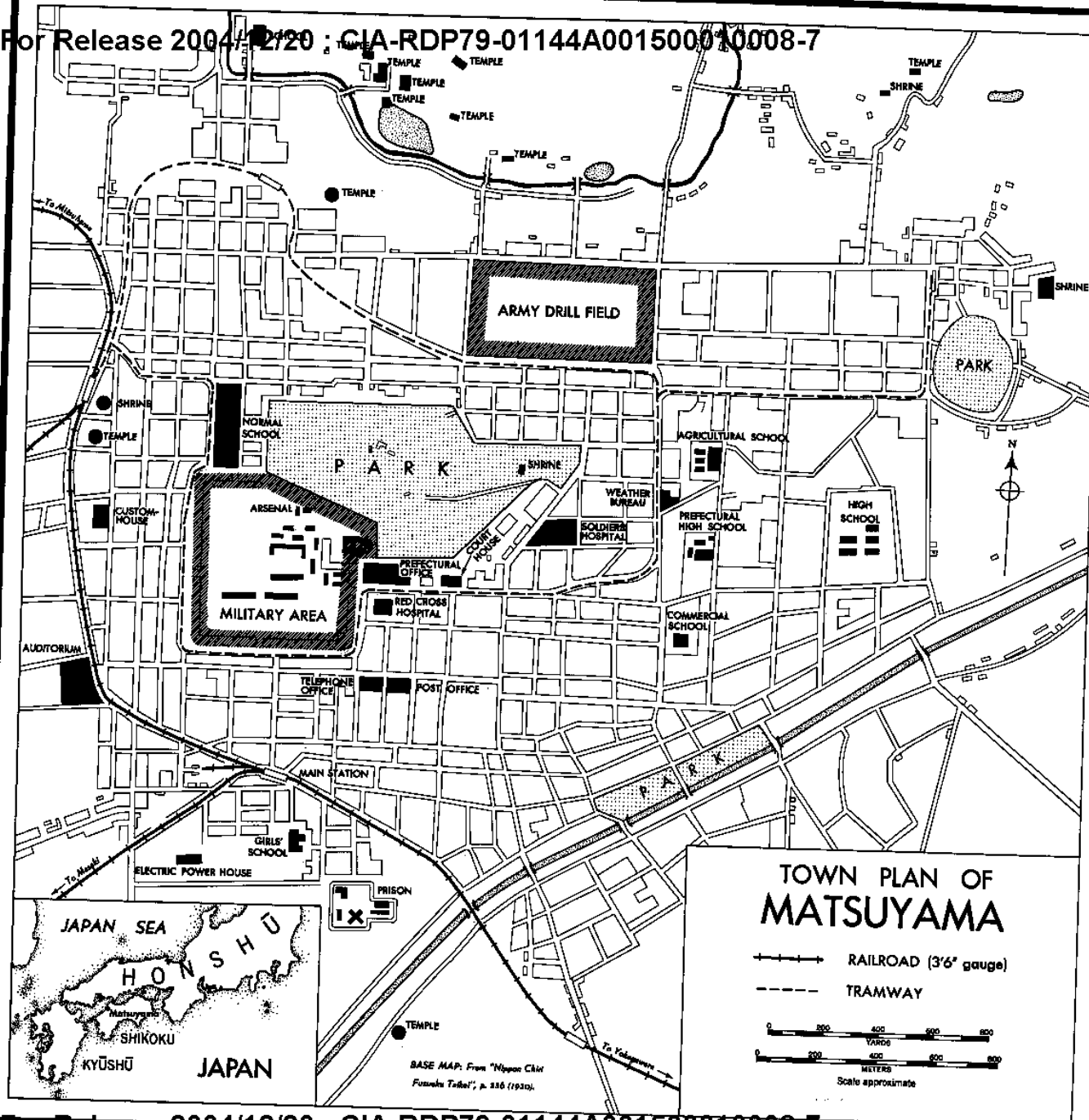
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FIGURE VIII - 43. *Hiroshima.*

FIGURE VIII - 45  
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FIGURE VIII - 45, Matsuyama.

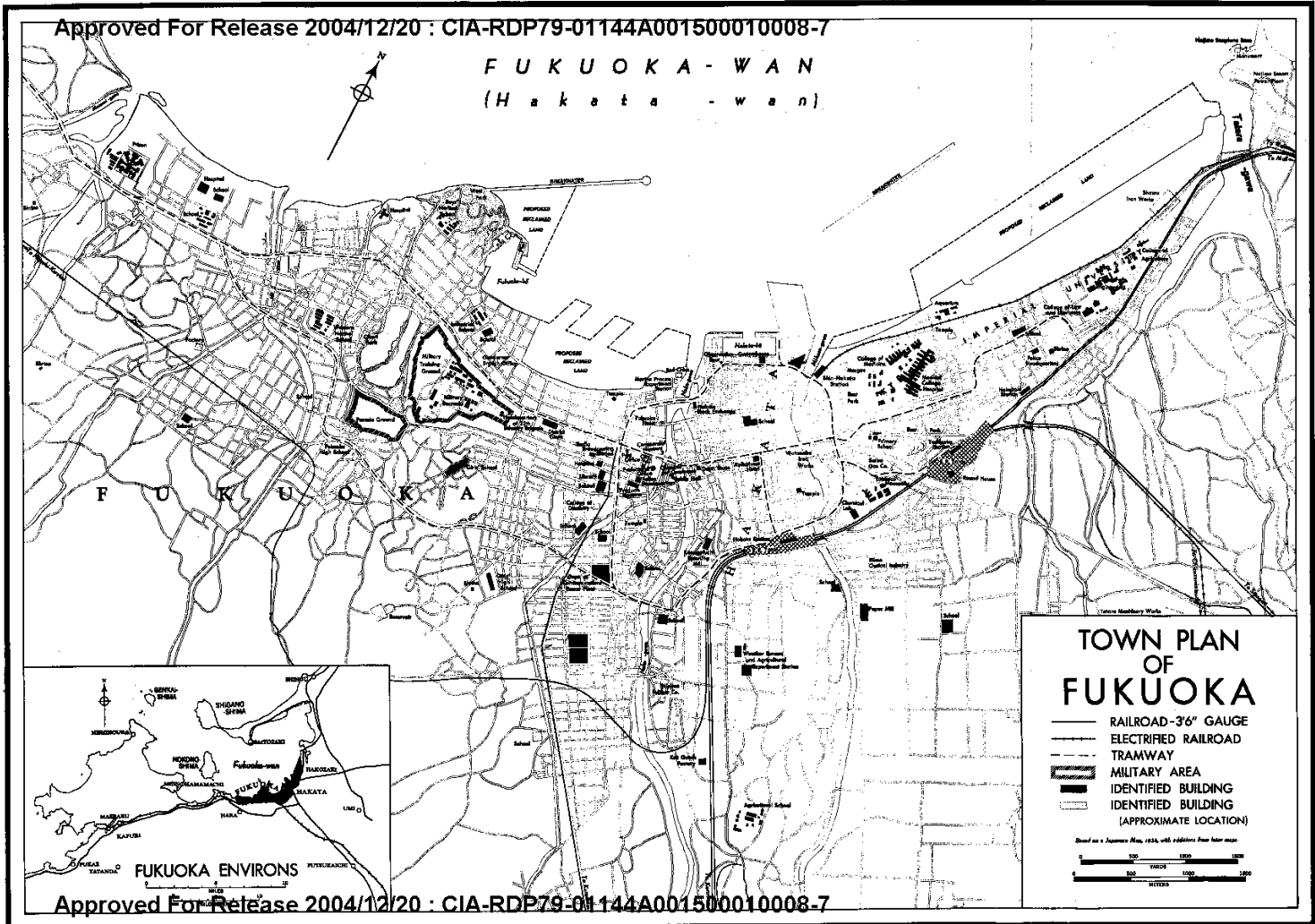


FIGURE VIII - 70. Fukuoka.

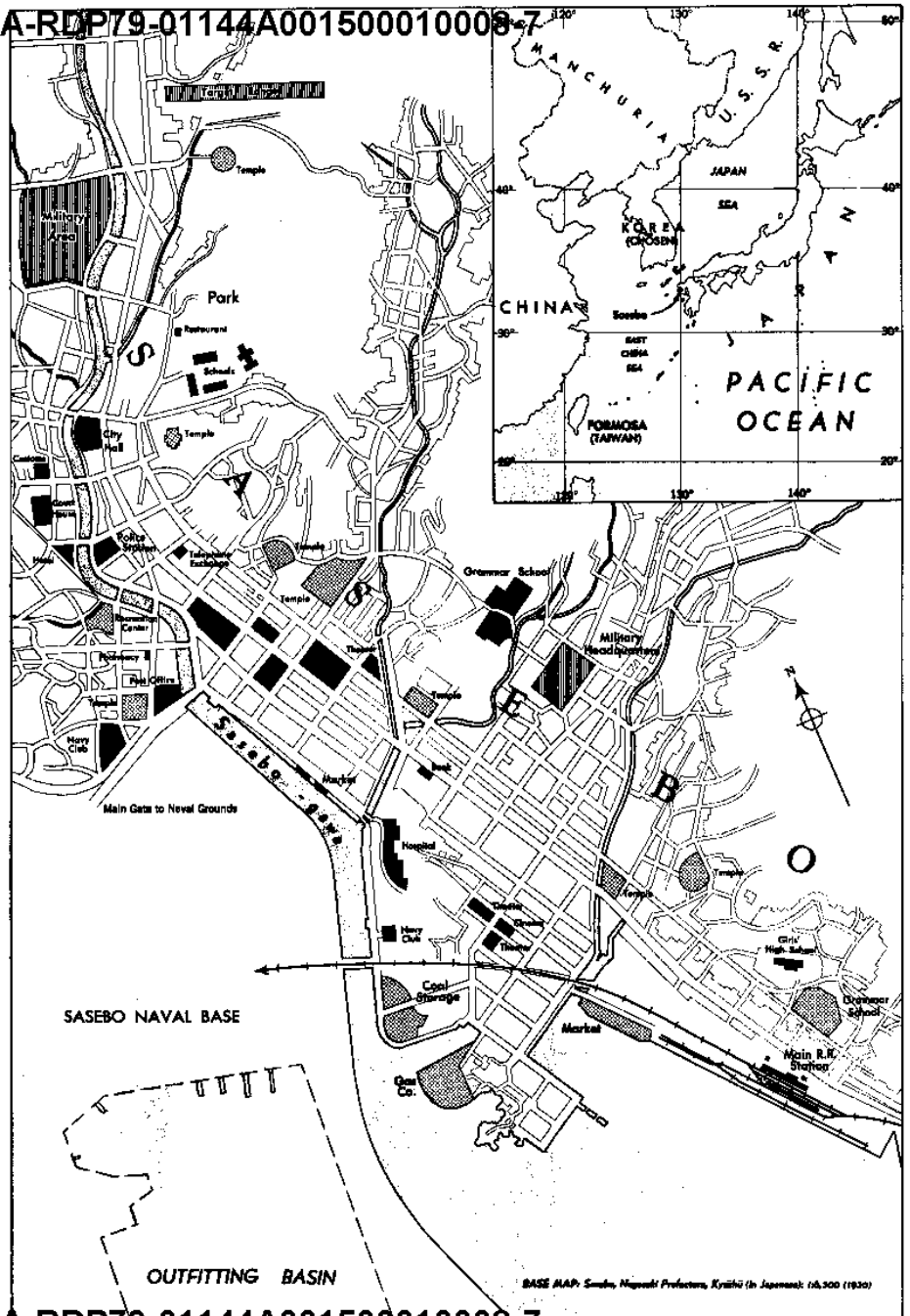


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# TOWN PLAN OF SASEBO

- IDENTIFIED BUILDING
- ▨ IDENTIFIED AREA
- ▤ MILITARY AREA
- +— RAILROAD (3'6" GAUGE)

0 500  
METERS  
0 500  
YARDS

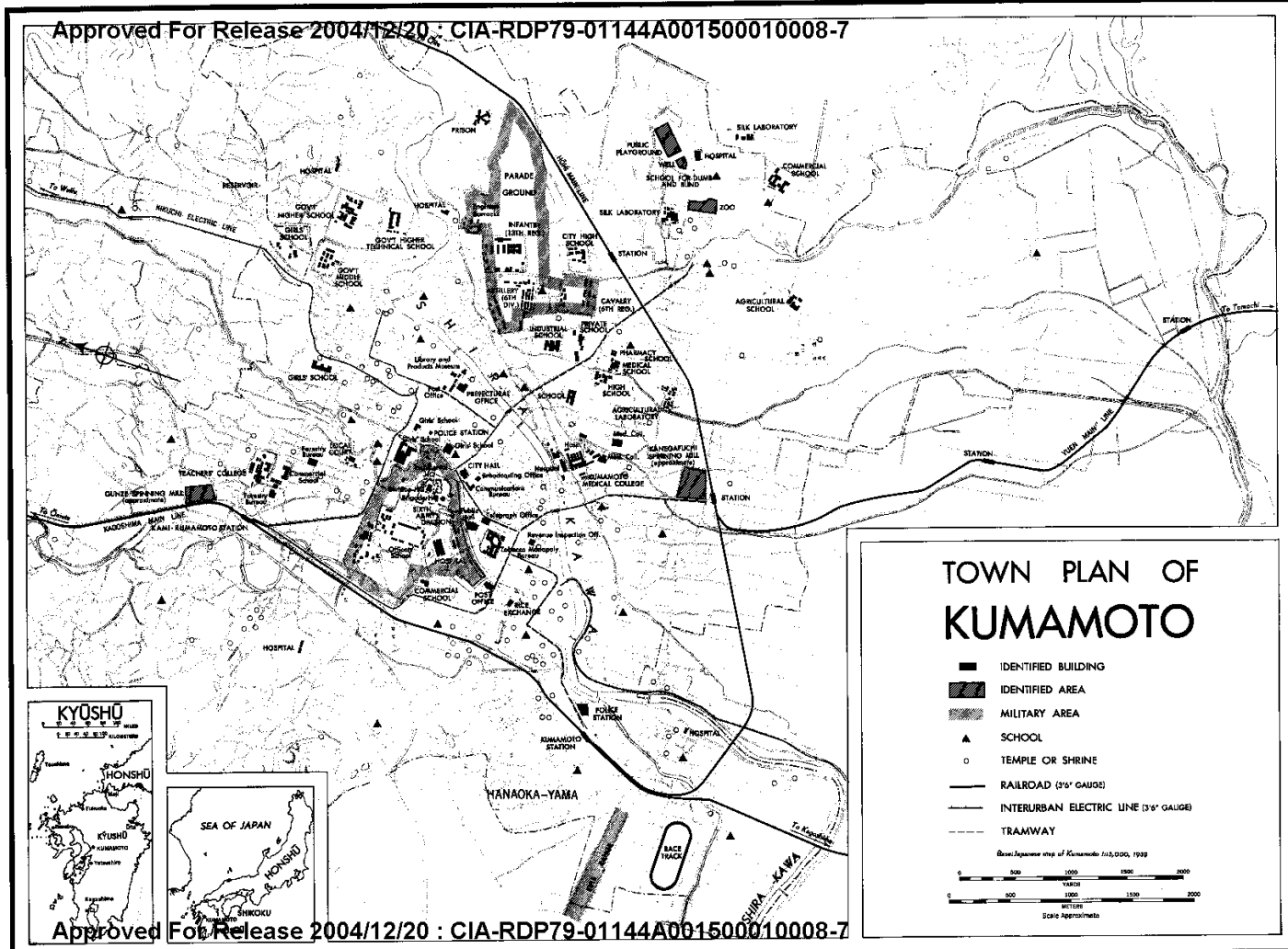


BASE MAP: Sasebo, Nagasaki Prefecture, Kyūshū (in Japanese) 1:6,300 (1930)

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FIGURE VIII - 90  
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FIGURE VIII-99  
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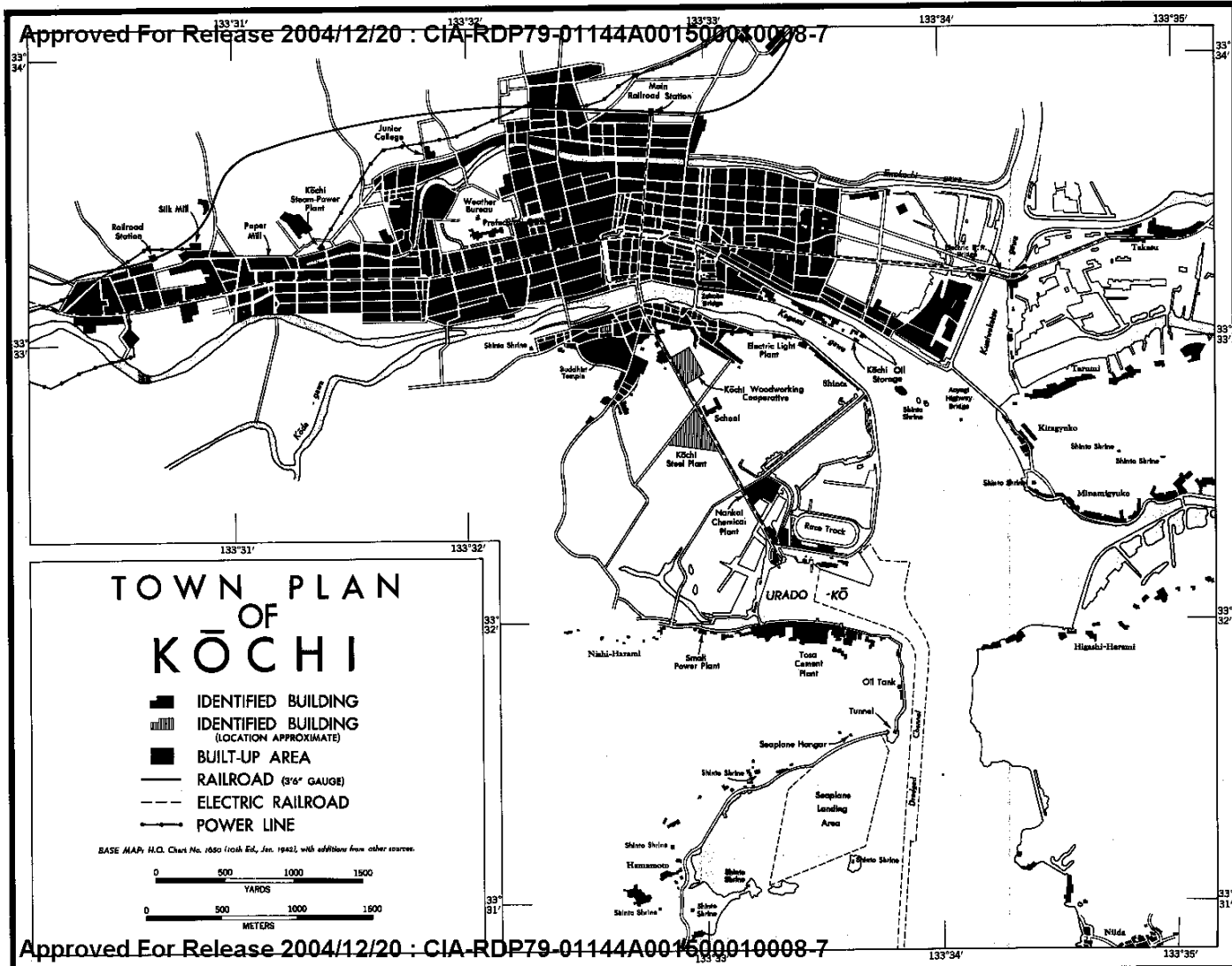


FIGURE VIII-105  
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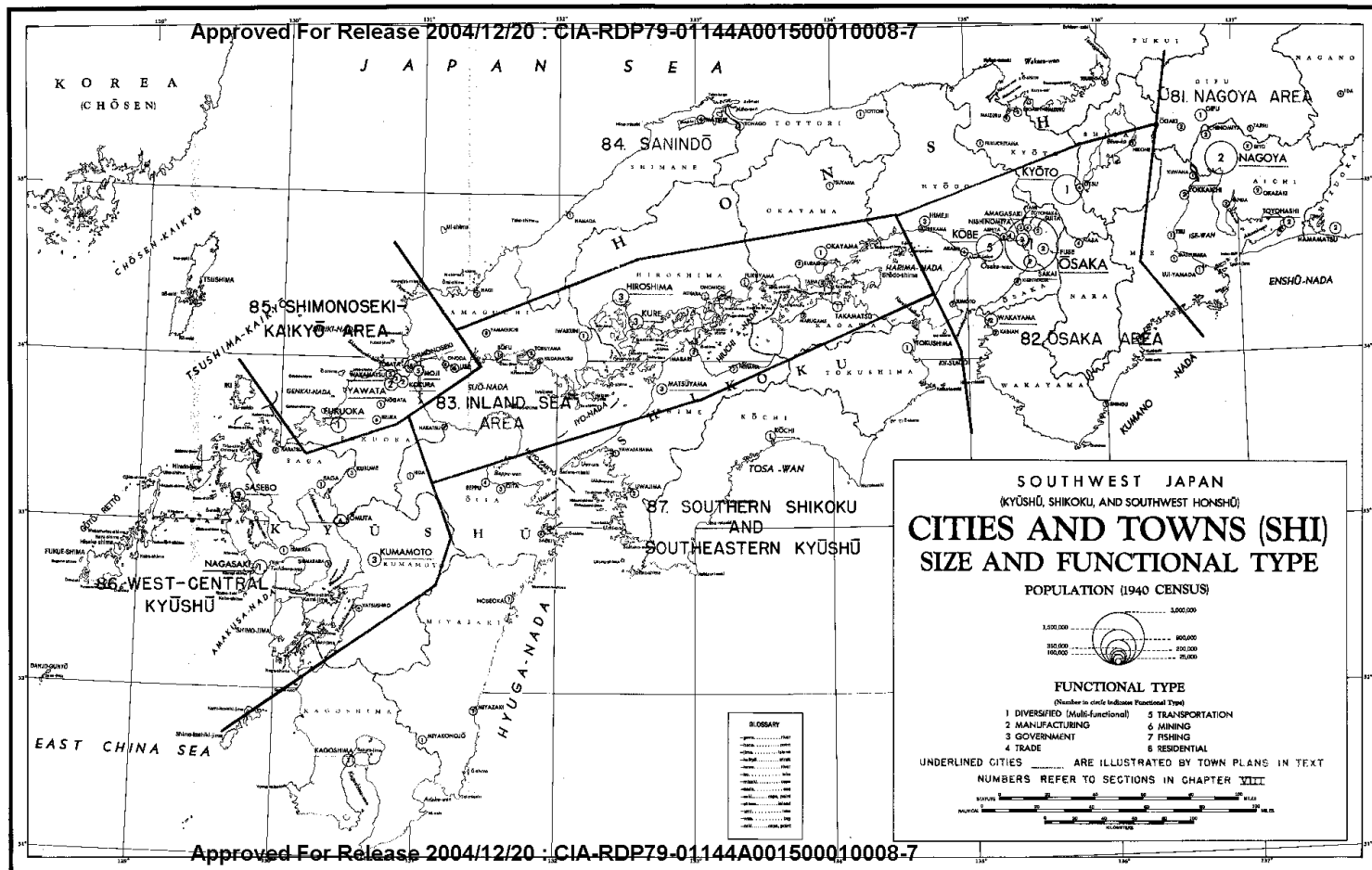


FIGURE VIII - 106  
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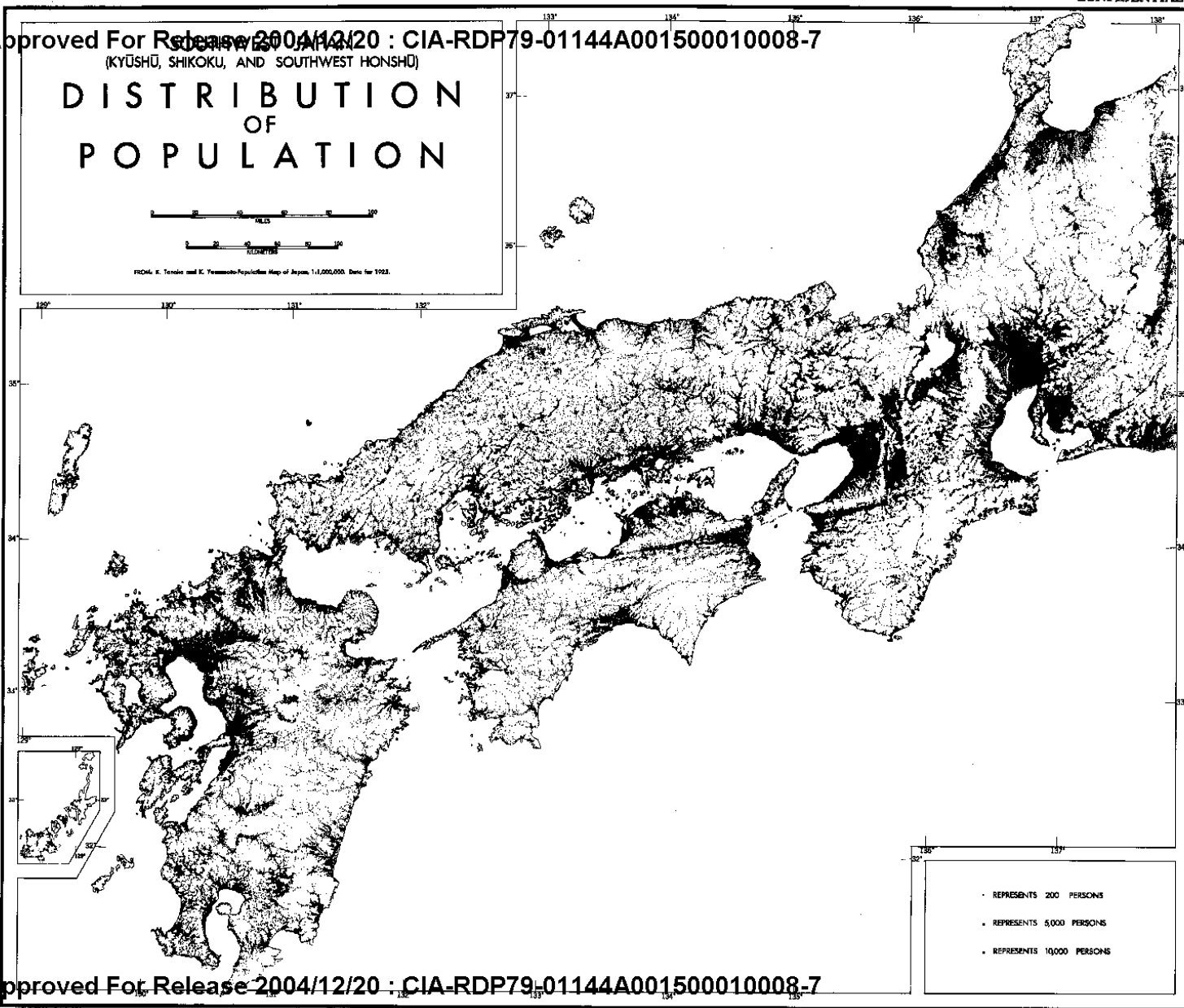
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SECRET JAN 84

# DISTRIBUTION OF POPULATION

0 20 40 60 80 100  
MILES

0 20 40 60 80 100  
KILOMETERS

FROM: E. Tensho and K. Yamamoto-Population Map of Japan, 1:1,000,000. Data for 1923.



- REPRESENTS 200 PERSONS
- REPRESENTS 5,000 PERSONS
- REPRESENTS 10,000 PERSONS

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FIGURE VIII - 106.  
Map of population distribution.

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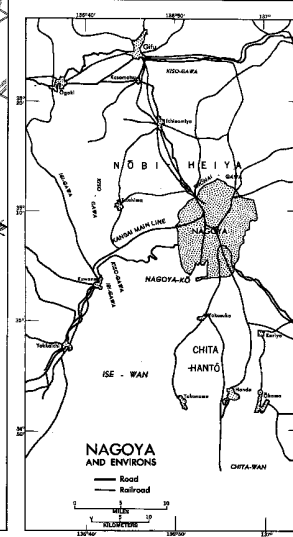
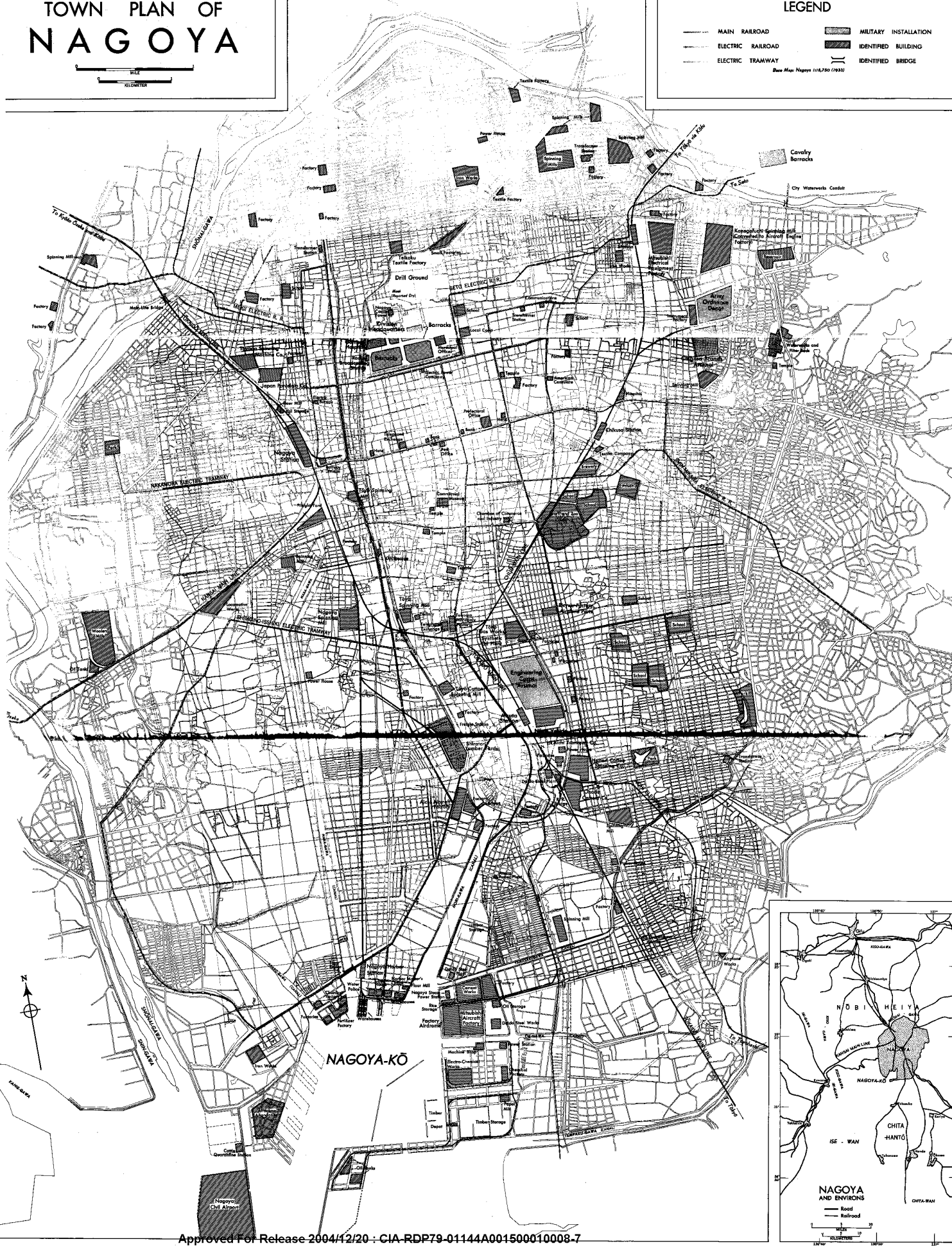
# TOWN PLAN OF NAGOYA



## LEGEND

- MAIN RAILROAD
- ELECTRIC RAILROAD
- ELECTRIC TRAMWAY
- MILITARY INSTALLATION
- IDENTIFIED BUILDING
- IDENTIFIED BRIDGE

Base Map: Nagoya 1:12,500 (1933)

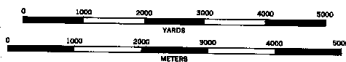


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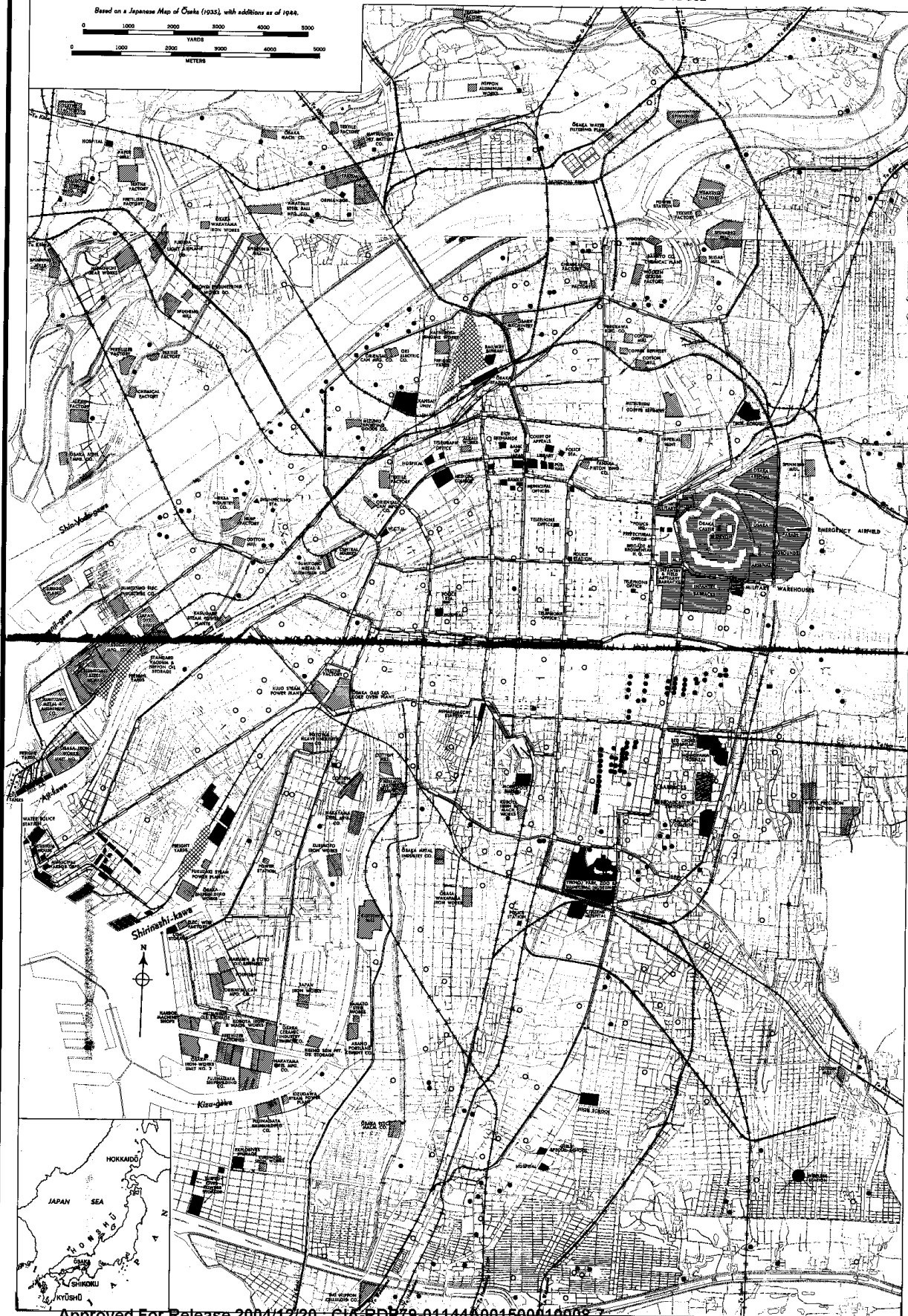
# CITY PLAN OF ŌSAKA

Based on a Japanese Map of Osaka (1935), with additions as of 1944.



- DOUBLE TRACK RAILROAD
- SINGLE TRACK RAILROAD
- TRAMWAY
- SUBWAY
- MILITARY AREA

- INDUSTRIAL PLANT
- OTHER IDENTIFIED BUILDING
- UNIDENTIFIED FACTORY
- SCHOOL
- TEMPLE
- WAREHOUSE



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